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MESSAGE

To

Dr.Swapnil Bumb,
Editor in Chief
International Journal of Scientific Study
An Official Journal of Medical Students Association of India.

Dear Dr.Swapnil,

Greetings for IMA Head Quarters New Delhi!

My heartiest Doctors Day Greetings to you all !

I am extremely happy to note that the Medical Students Association of India is doing excellent works for the Welfare of the Medical Students and also for the youths in general. I am enjoying your activities which are mounting day by day to reach Himalayan heights very soon.

I am sure for any organization the Journal is the most important one to satisfy the members in CME activities, communications, action taken report, future plans etc. etc. I am sure that for the first time in India you are venturing for the same to produce a high - tech Journal of your own.

I am sure your Journal will act as link between your members to develop inter member Relationships and also relationship with other associations and public.

I congratulate and complement you for the wonderful work and I wish the Journal every success, serving its purpose to the Student population and also to the Medical Profession as whole.

Thanking you

Yours Sincerely,

Dr.K. Vijayakumar.
National President - 2013
IMA Head Quarters,
New Delhi.

From The Desk of

Editor in Chief

It gives me an immense pleasure to write from the Editorial desk in our Inaugural Issue of this journal. The idea of this journal cropped into my mind as we have seen that in India, medical and dental education has remained static in the last few years and this has left research in a very poor state. Against this backdrop, the idea of promoting research culture at the undergraduate and post graduate level may look unrealistic and has affected the mother of new knowledge adversely. It's unfortunate for us to state, research is the most neglected field in medical and dental schools in India and to mention the least, the declining interest of medical fraternity in research is rather a global phenomenon.

MSA-India understands to achieve the goal of "Health for all" isn't an easy task but we as medical students worldwide are committed to bring a change and this research initiative of ours could possibly open up avenues to bring new studies in place especially in finding absolute cure to HIV/AIDS etc. Therefore, we believe the first step to bring a change and inculcate research aptitude in our students in India is already in progress and for more students to get involved in it we are coming up with its very own official journal which is titled as

"International Journal of Scientific Study".

We welcome all types of article like Original Articles, Case Reports, Systematic Reviews, Review Articles, Short Communications and Letter to Editor. The articles should point out similarities or differences in approaches to health care in various regions because looking at a problem from multiple

viewpoints can lead to innovative ideas and open new pathways around existing

roadblocks that are currently impeding progress. The journal also is interested in fresh ideas that do not conform to existing paradigms.

The mission of this new journal is to provide a platform for prompt publication of new concepts that will lead to an improvement of health for individuals and various groups throughout the world. So I request all the research lovers to take full advantage of this platform which we are providing you to publish your research skills and let the world know about it.

At last, I would like to thank my Entire Editorial Committee, Students Ambassadors for their hard work. This wasn't possible without their help. A special thanks to Mr. Pratap Naidu (Founder of MSAI) for bringing this International organization to India & Dr. Safalya Kadtane, Associate Production Editor for coming up with wonderful journal design.

Thanking You,

Dr. Swapnil S. Bumb

Editor-In-Chief
International Journal of Scientific Study





From The Desk of

Editor

It is my pleasure to write the Inaugural Editorial column. The idea of an International Journal of Scientific Study (IJSS) has been germinating for over two years and finally the idea has come to fruition. The Medical Student Association of India (MSA-India) is grateful to Dr. Swapnil S. Bumb for making this Journal a reality. The Editorial Board is represented by members of MSA-India with support and contributions from International Federation of Medical Students' Association (IFMSA). This shows major projects can be realized when different sectors work collaboratively. In time, the IJSS will become a recognized forum for learning and exchange of ideas by and for medical professionals not only in India, but throughout the globe.

An important decision made by the Editorial Board prior to launch was that the journal must be for the many and not just for a few who are engaged in clinical research. All of us, whether we are doctors, nurses, physiotherapists, dentists or in any other field of health care, must take a greater responsibility for managing and solving the many unique health issues and problems that we face in our region. We must engage in research and voice our opinions by publishing them in this, our local journal. To ensure wide readership, the journal will carry a variety of articles of general interest, as well as scientific articles, based on topics relevant to our region. Articles in the following categories are welcome: Editorials, Letter to Editor, Major and Minor Reviews, Original Research, Notable Clinical Cases, Lessons from Practice, Diagnostic Dilemma, Viewpoint, Opinion, Hypothesis, Medico-Legal

issues, Topic for Debate, Clinical Ethics, etc.

I encourage the new generation of health professionals to create and publish new research data in this journal and adopt critical thinking habits to address our health problems. This journal will encourage international research collaborations that result in joint publications of high international standards. Finally I want to thank Editorial Board for their tireless contributions and efforts to make IJSS a reality. Thanks also to our Advisory and Reviewers, both national and international, who provided invaluable advice and peer review to ensure sub-standard articles were revised appropriately or in some cases rejected. This is a major milestone for us and I encourage all my colleagues in the health care sector to embrace and support this journal. The continuing success of this journal should give us a sense of pride and achievement.



Thanking You,

Dhairya Lakhani

Editor

International Journal of Scientific Study (IJSS)

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Use of Auricular Cartilage as A Graft in Cleft Rhinoplasty - 'An Ear For A Nose'

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Abstract

The aim is to study the use of auricular cartilage in cleft rhinoplasty. 10 patients with unilateral cleft lip nasal deformity underwent secondary cleft rhinoplasty using auricular cartilage as an onlay graft to augment the hypoplastic ala on the cleft side and also as a columellar strut. The patients were in the age group of 16 to 30 years, with a mean age of 21.1 years. All the cases have been followed up from the time of operation on a monthly basis up to a maximum of 24 months. The mean follow up period in this study was 12.8 months. Clinical analysis was performed preoperatively and 5 months post operatively and on a monthly basis ever since. The present study demonstrated that auricular cartilage proved to be a good onlay graft to augment the hypoplastic cartilage and also as a strong columellar strut. We have achieved a 23% decrease in the alar width, 30% increase in the alar height and 58% increase in the columellar height on the cleft side post operatively. There was no donor site or recipient site morbidity in any of our cases. Satisfactory results were obtained. This procedure can be regarded as a good method for correction of mild to moderate cleft lip nasal defects.

Keywords: Cleft rhinoplasty, Auricular cartilage

Introduction:

The nose, as the most prominent facial feature, becomes the focus of psychologic and social attention when it is distinguished by anomalous features. Nasal aesthetics are central in our appreciation and attractiveness of the face. The balance of elements of the nose from any point of view affects the overall balance and aesthetics of the entire face. Understanding nasal aesthetics and the interdependence with the rest of the face is as important as the technical skill and expertise required to perform the elegant and complex operation of rhinoplasty.

Individuals born with a cleft lip have an associated characteristic nasal deformity. Cleft lip nasal deformity has lack of development of some

elements of the nose and displacement of other parts of the nasal anatomy. The cartilage giving shape to the tip of the nose is usually underdeveloped, flattened with less projection, and positioned lower than the tip cartilage. The nostril shape and width are not symmetrical. The septum is also deviated. One consequence of these cleft lip nasal deformities is nasal airway obstruction. Another consequence is the appearance that lacks symmetry and displays a characteristic appearance in the nose that may remain a reminder of the cleft lip, even after the best of cleft lip surgical repair.

Despite the current trend for increasing attention toward nasal reconstruction at the time of primary lip repair, a need still exists for achieving

aesthetic improvement of the cleft lip nasal deformity at a later date.

The final defining component receiving attention by parents, practitioners, and patients in achieving a normal appearance in a patient with cleft features currently is the nose. In current practice, we are better able to reconstruct the faces of children with cleft features to near-normal anatomic form and physiologic function. We are now able to counsel parents with modern knowledge and technology, and their children, whose appearance may seem somewhat disfiguring at birth, can be transformed into children with near normal appearances and acceptable smiles.

Methodology:

The present study was done in Department Of Oral and Maxillofacial Surgery, Krishnadevaraya College of Dental Sciences, Bangalore. Ten patients with unilateral cleft lip nasal deformity underwent secondary cleft rhinoplasty using auricular cartilage as an onlay graft to augment the hypoplastic ala on the cleft side and also as a columellar strut. Auricular cartilage was harvested using posterior auricular approach. An open rhinoplasty was performed and the harvested cartilage was used as a columellar strut and also for reinforcing the lower lateral alar cartilage on the cleft side. Clinical analysis of patients was done pre-operatively (figure 1 and 2) and for 5 months post operatively.

Procedure:

The patients were operated under general anaesthesia. This procedure consists of two steps. First auricular cartilage was harvested and then cleft rhinoplasty was performed.

Harvesting Auricular Cartilage:

Standard skin was preparation done. Patient was draped in a sterile fashion. A linear incision was marked in the retroauricular region (figure 3). About 5cc of local anesthesia with adrenaline (1:200000) was injected in the operative site. A linear incision was placed behind the ear. Overlying skin and

perichondrium were raised to expose the underlying auricular cartilage. The periphery of the desired graft was defined with an incision over the exposed cartilage. The cartilage was then slowly dissected off its underlying attachments and was harvested without causing any perforations in the graft and the underlying soft tissue (figure 4, 5, 6). One layer closure was achieved using ethilon 4-0 by placing continuous locking sutures (figure 7). Betadine dressing was given over the sutures and pressure pack was placed over the concha.

Procedure of Rhinoplasty:

An incision line was marked with indelible ink. Transcolumellar incision with infracartilagenous rim incision was marked bilaterally (figure 8). About 10cc of local anesthesia with adrenaline (1:200000) was injected in the operative site with a 26 gauge spinal needle. It facilitated hydro dissection, local hemostasis and post operative analgesia at the site. A 'V' shaped notch was made in the transcolumellar incision, which was placed at the junction of the lower one third and upper two third of the columella. The nostril rim was held gently with an alar hook and infracartilagenous rim incisions were placed. The skin was dissected over the tip and the alar cartilages in the submuscular aponeurotic plane. Dissection superficial to this plane results in compromise of the vascular supply to the soft tissues and makes the dissection very difficult. The lower lateral cartilages were freed of all its attachments. The entire cartilaginous skeleton of the lower lateral cartilages were exposed (figure 9).

The harvested auricular cartilage was divided into three strips over a sterile glass slab. One of the strips was used as an onlay graft over the deformed ala. It was sutured to the lateral crus (figure 10). A pocket was created in between the two medial crura in the columellar region. The remaining two strips were sutured to each other to form a columellar strut and placed in the pocket. It was then sutured with ethilon 4-0 to the medial crura on either side (figure 11). The degree of the tip projection needed on the deformed side as well as the columellar height was determined.



Figure 1: Pre-Operative Photograph Of the Defect



Figure 2: Pre Operative Worm's Eye



Figure 3: Linear Incision



Figure 4: Auricular Cartilage Identified and Marked Before Harvesting

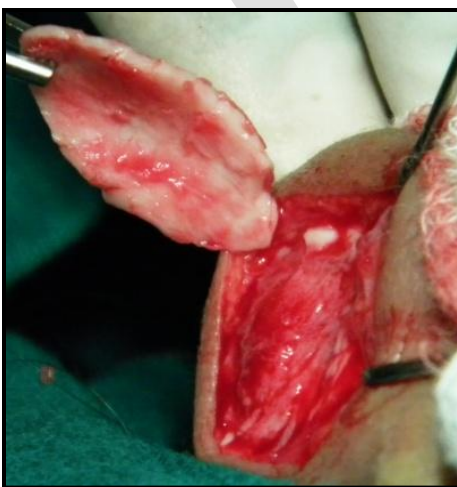


Figure 5: Auricular Cartilage Being Freed of Its Attachment from the Underlying Tissues



Figure 6: Auricular Cartilage



Figure 7: Continuous Locking Sutures Placed



Figure 8: Transcolumellar Incision Marked



Figure 9: Dissection Done and Alar Cartilages Freed Completely from All



Figure 10: Onlay Alar Cartilage Graft Placed

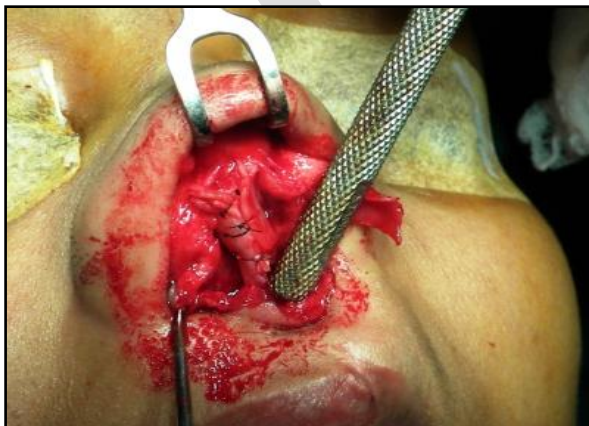


Figure 11: Columellar Strut Placed and Sutured in the Pocket Created Between the Medial Crura



Figure 12: Final Closure Done

Corrections were performed until the desired outcome was achieved. After augmentation was completed, incisions were closed endonasally with 4-0 vicryl, absorbable sutures. The skin and soft tissue envelope were carefully redraped over the nasal skeleton and sutured in place with 5-0 ethilon (figure 12). A soframycin nasal pack was placed and nasal dressing was done to hold the cartilaginous framework in the new desired position. Patients were educated on standard postoperative instructions. Appropriate postoperative prophylactic antibiotics were administered. Patients were advised to avoid any heavy lifting, straining, or vigorous physical activity. Nasal pack was removed on the 2nd postoperative day and the nasal dressing was repeated. All sutures were removed after 10 days. Nasal dressings were continued for another 10 days (figure 13 and 14).

Results:

The patients were in the age group of 16 to 30 years, with a mean age of 21.1 years. All the cases have been followed up from the time of operation on a monthly basis upto 24 months. Clinical analysis was performed preoperatively and 5 months post operatively. Clinically they were evaluated for nasal width, Nasolabial angle, alar width, alar height, columellar height and the angle between medial and lateral crura. Photographs were taken in Frontal view, lateral view, worm's eye view and bird's eye view pre operatively and 5 months post operatively. The cleft lip nasal deformity is disfiguring mainly due to the asymmetry of the external nares, therefore the success of cleft rhinoplasty can be evaluated by comparing the differences between the non cleft and cleft side pre and post operatively.

We found that in all patients preoperatively on an average the alar width on the cleft side was 4 – 5 mm more than the non cleft side. The height of the columella and the ala on the cleft side was found to be 2-3 mm deficient. The Nasolabial angle was decreased and the intra crural angle was markedly obtuse on the cleft side. (figure 15 and 16)

Postoperatively when evaluated the changes observed on the non cleft side were not significant but whereas, on the cleft side, there were statistically significant changes. The mean alar width on the cleft side showed a decrease by 3 mm, columellar height and alar height increased by 1.5 mm, the nasal width decreased by 4-5mm, the Nasolabial angle increased by 10° and the intercrural angle decreased by 13.5° (figure 17 to 18) postoperatively on the cleft side there was a 23% decrease in the alar width, 30% increase in the alar height and 58% increase in the columellar height. Donor site morbidity was not seen in any patient and none of the patients developed any complications.

Discussion:

The nasal deformity in unilateral clefts is an integral part of the complex cleft syndrome that includes the lip, alveolus, palate, maxilla, and nose. Unilateral clefting, both complete and incomplete, results in a nasal deformity that may be caused by three major factors: (a) imbalance of the facial musculature, (b) hypoplasia of the skeletal base, and (c) asymmetry of the cartilaginous framework.¹

Imbalance of the facial musculature

Muscle imbalance affects nasal symmetry. Disruption of the orbicularis oris muscle creates a situation in which the facial muscles attached to the orbicularis oris on the cleft side pull the base of the ala more laterally than on the normal side. The greater the separation of the orbicularis oris, the more severe the cleft nasal deformity. The existing muscle imbalance results in displacement of the alar base and changes the orientation of the nostril from oblique to horizontal. This affects the position of the lower lateral cartilage. Correction of the muscle imbalance, which takes place during primary lip repair, does not necessarily alleviate the existing nasal deformity totally because displacement of the lower lateral cartilage persists, resulting in a typical unilateral cleft lip nasal deformity.



Figure 13: Five Months Post Operative

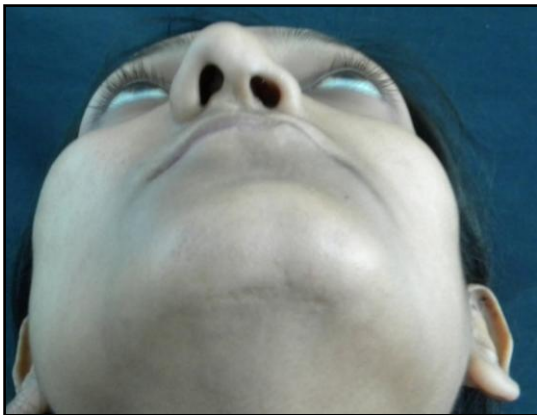


Figure 15: Pre Operative Worm's Eye View



Figure 17: Post Operative View of the Defect

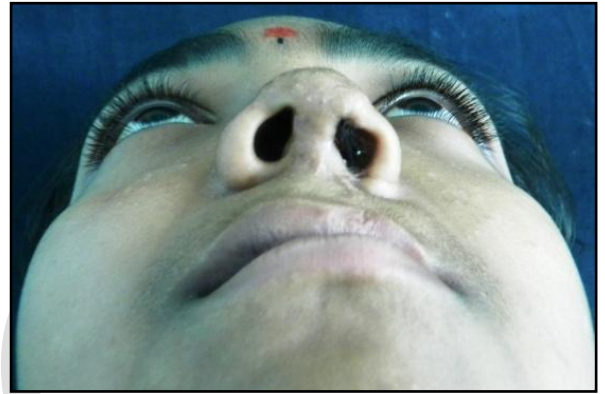


Figure 14: Post Operative Worm's Eye View



Figure 16: Pre Operative View of the Defect



Figure 18: Post Operative Worm's Eye View

Table 1: Pre Operative Values:

			P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
1	NASAL WIDTH in mm		32	40	29	34	33	31	34	33	38	40
2	NASOLABIAL ANGLE		70°	95°	85°	90°	80°	95°	80°	76°	60°	90°
4	ALAR WIDTH in mm	N	10	9	7	7	6	8	7	5	11	9
		C	13	21	11	11	9	12	16	9	14	14
5	ALAR HEIGHT in mm	N	8	9	9	8	9	10	7	8	6	8
		C	5	6	7	5	6	7	4	5	3	5
6	COLUMELLA HEIGHT in mm	N	6	5	7	6	6	5	5	5	5	5
		C	3	2	4	4	4	3	2	2	2	2
7	ANGLE BETWEEN MEDIAL & LATERAL CRULA	N	85°	63°	60°	90°	65°	88°	90°	70°	100°	85°
		C	105°	90°	85°	115°	100°	95°	125°	95°	115°	120°

Table 2: Post Operative Values:

			P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
1	NASAL WIDTH in mm		29	37	28	31	30	30	32	30	35	38
2	NASOLABIAL ANGLE		90°	100°	95°	100°	95°	100°	85°	84°	75°	95°
4	ALAR WIDTH in mm	N	9	9	6	7	6	8	7	5	11	9
		C	11	12	8	9	7	9	11	7	12	12
5	ALAR HEIGHT in mm	N	8	9	9	8	9	10	7	8	6	8
		C	7	7	8	7	7	9	5	7	5	6
6	COLUMELLA HEIGHT in mm	N	6	5	7	6	6	5	5	5	5	5
		C	5	4	6	5	5	5	3	3	4	3
7	ANGLE BETWEEN MEDIAL & LATERAL CRULA	N	80°	60°	55°	90°	65°	85°	90°	70°	95°	85°
		C	90°	80°	65°	100°	85°	90°	110°	90°	100°	100°

Unless lip repair is combined with simultaneous repositioning of the alar base and lower lateral cartilage, the nasal deformity will not improve with growth. The majority of patients require secondary correction to rearrange the lower lateral cartilage.¹



Hypoplasia of the skeletal base

The most severe deformity occurs in complete unilateral clefts owing to the asymmetry and hypoplasia of the maxillary segments. Hypoplasia of the lesser maxillary segment occurs most commonly along its edges and at the edge of the piriform aperture. The existing hypoplasia may accentuate the nasal deformity owing to the imbalance and asymmetry of the alar base. Asymmetry of these segments and the width of the cleft greatly contribute to the extent and severity of the nasal deformity.

Asymmetry of the cartilaginous framework.

The lower lateral cartilage may be deformed in several ways. The orientation of the medial to lateral crura is changed because the ala is extended with its base pulled laterally and inferiorly. The medial crus is shorter than that on the noncleft side, whereas the lateral crus is longer than its noncleft counterpart. The domes also differ; the dome on the cleft side is obtuse and lower than the dome on the noncleft side. This cartilage also is deformed in the sense that it is rotated downward in the area of the nasal tip and drawn into an S-shaped fold because the ala is pulled laterally and the cartilage buckles. This distortion of the lower lateral cartilage, when severe, is difficult to correct during the primary operation.¹

The columella and nasal septum also may be affected by the morphologic changes associated with the unilateral cleft. Since the medial crus of the lower lateral cartilage is shorter on the cleft side, the columella is also shorter. The columella is pulled to the noncleft side by the muscles entering its base and

joined by the orbicularis oris muscle. The septal deformity almost always is present; however the severity of it varies greatly. The caudal edge usually is deviated to the noncleft side, and the entire septum may be deformed in two planes- sagittal and frontal. The base of the septum is dislocated from the groove on the crest of the maxilla. The septal deviation may be so severe that it partially or completely obstructs the nasal passage on the cleft side.^{1,2}

There is no question that each of these factors - muscle imbalance, nasomaxillary hypoplasia, and asymmetry of the cartilaginous frame work, results in a nasal deformity of various degrees of severity. However, a combination of these factors, which occurs in almost all patients with complete unilateral clefts, produces the most severe forms of nasal deformities.

For the full correction of the deformities of the nose in the cleft patient, the maxilla, the paranasal region, and the nose may all require correction. These can be either addressed in one sitting, or they can be staged. First, the maxilla is corrected by Le fort I osteotomy. This will improve the position of the upper lip and nasal tip. Next the oronasal fistula is closed and bone grafting performed in the paranasal region thus improving the alar base. Lastly the nose is corrected.² In our study, none of the cases selected for secondary rhinoplasty wished to undergo Le fort I osteotomy. 4 cases underwent secondary alveolar bone grafting prior to rhinoplasty, because their paranasal region was severely deficient and the alar bases needed to be supported.

In the evolution of surgical repair of cleft lip nose deformity, numerous methods of repair have been proposed, testifying to the complexity of the problem and the continuing pursuit for improved results.³ Sorting through the various procedures, it is apparent that they can be reduced to two basic architectural principles. The first involves composite rotation of ala and the second emphasises correction of the cartilaginous framework and soft tissues by alar cartilage transposition, relocation, or suture suspension and by cartilage grafting.⁴

The best approach to proper correction of the cleft lip nasal deformity is through the external approach using transcolumellar incisions. The alar cartilages are too asymmetrical to easily correct through intranasal approach. Accurate suturing under direct vision offers the best hope for repair.³

In our study we have placed an incision similar to the incision described by Goodman and Zorn, which they called it the “butterfly incision”, which is a modification of the potter’s incision. A ‘V’ shaped notch was placed in the transcolumellar incision, Instead of placing an inverted v at the middle of the columella as described by Goodman and Zorn. This slight modification allowed us to engage the skin hook in the V shaped tissue, which helped us in retracting the columella superiorly.^{3,5,6}

As Potter (1954) we also felt a more complete release was necessary. We freed up all the attachments to the lateral crus except for a medially based chondromucosal flap. The lateral crus was advanced anteriorly and medially and sutured to the normal alar cartilage.^{6,7}

Onlay grafts are required to achieve the ideal cosmetic result, despite best attempts at reconfiguring the ala via simple rotation or advancement. Grafts contribute to bulk for improved cosmesis and may serve to reinforce the atrophic weak alar cartilage.

Grafts may be used as spreader grafts and for augmentation of the dorsum, tip, ala, radix and columella. Autologous grafts are preferable over other options, such as homologous grafts and alloplastic materials, because the use of the patient’s own tissue generally results in fewer complications. Bone and cartilage grafts are among the most widely used adjuvants for rhinoplasty. Cartilage grafts can be harvested from the septum, ear, or rib; bone grafts from the cranium, rib, and iliac crest; and fascial grafts from the temporoparietal fascia or cadavers.^{6,8} If autologous grafts are not available, other options include alloplastic materials such as medpor, silicone, and siliastic.

Cartilage grafts are classically divided into contouring grafts and structural grafts.

Contouring cartilage grafts are added to the native osteocartilaginous nose in order to obtain an aesthetically pleasing appearance. The dorsum and infratip are the most common sites of contouring graft implantation, which produces a harmonious dorsal unit and optimizes tip projection. The grafts are placed in the coronal plane. They must be secured, for instance using resorbable or nonresorbable sutures or glue. Changes over time at the graft-skin interface may lead to unbecoming graft visibility through the skin.⁹

Reconstructive grafts play a biomechanical role that ensures stability of the cartilaginous framework of the mobile nose. These grafts correct or prevent inspiratory collapse of the middle third of the nose and of the nares. Spreader grafts stabilize the triangular cartilages at the dorsum. Columellar struts stabilize the base of the nose. Alar batten grafts strengthen the lateral crura. Reconstructive grafts are positioned chiefly in the sagittal plane. Their stability over time is highly satisfactory, particularly when they are secured via an open approach. Reconstructive grafts allow morphological and functional reconstruction of the nasal tip in patients undergoing secondary cleft rhinoplasty.⁹

Cartilage grafts are usually harvested from the septum, which has the obvious advantage of being located at the surgical site but its disadvantage being minimal volume and deformation due to cleft. The inferior lateral cartilage may be used, its main advantage being thinness and its main drawback being limited volume. When the amount of available septal cartilage is inadequate, auricular cartilage can be used. It may offer a large area for graft harvesting, which does not usually induce local sequelae. When very large amount of cartilage is needed, for instance to perform augmentation of the dorsum, rib cartilage can be taken from the lower chest, the main disadvantages being a scar, increased operating time, some degree of postoperative pain and donor site morbidity. Rib cartilage is abundant and easy to shape.^{9,10}

In this study we have utilised Auricular cartilage as onlay cartilage grafts and columellar struts. It proved to be an excellent source for an

onlay alar graft because it recreated the natural curvature of the ala. Onlay cartilage grafts augmented the weak alar cartilage on the cleft side. It corrected alar buckling, improved contour of flattened ala, corrected obtuse intracural angle and also improved nasal tip projection. The working columella strut gave strength to the medial crura, and has also been used as a splint for the caudal edge of the septum when there are horizontal angulations of the septum. The columella strut is sutured directly to the caudal septum so that the whole complex prevents caudal angulations of the septum and strengthens tip support.¹⁰ In our experience, we obtained satisfactory results by using auricular cartilage as a graft material for augmentation in cases of secondary cleft rhinoplasty.

Conclusion

The multitude of approaches to secondary unilateral cleft lip nasal repair is a testament to the challenge of secondary cleft lip nasal reconstruction. An individualized approach, with the appropriate surgical technique and an understanding of the fundamental anatomical changes, is imperative to a successful outcome. Ten patients with unilateral cleft lip nasal deformity were included in our study. Open rhinoplasty was performed and auricular cartilage was used to augment the alar cartilage on the cleft side and also as a columellar strut.

We found auricular cartilage to be very beneficial. As it is a part of the patients own body, rejection never occurs. It shows greater resistance to infection than any alloplastic material. The harvested cartilage conformed to the shape of the ala and it was easy to carve to the required size and shape; hence it was able to cope with individual variations. The success rate of auricular cartilage graft was 100% in our study and same results were seen in a study conducted by Murrell and George.¹¹

The open rhinoplasty approach offered better visualisation of the defect and easier manipulation of the cartilages. The advantages outweighed the cost of minimal scar over the columella. The success of cleft rhinoplasty was evaluated by comparing the

symmetry, Nasolabial angle and the intracural angle of the nares on the non cleft and cleft sides pre and post operatively. There was no donor site or recipient site morbidity in any of our cases and satisfactory results were obtained.

References:

1. Janusz Bardach and Court Cutting: Nasal Deformity Associated with Unilateral Clefts. Excerpt from Multidisciplinary Management of Cleft Lip and Palate. 2001
2. Matukas, P.J.Louis: Secondary management of the nose in the cleft patient. International journal of oral and maxillofacial surgery 22:195 – 199, 1993
3. Cronin D.Thomas and Denkler A.K: Correction of unilateral cleft lip nose. Plastic Reconstructive Surgery 82. (3) 419, 1988.
4. Blackwell J.S. et al: Onlay cartilage graft of the alar lateral crus for the cleft lip nasal deformities. Plastic Reconstructive Surgery 76: 395, 1985.
5. Matsuya T et al: Secondary rhinoplasty using flying bird and vestibular tornado incisions for unilateral cleft lip patients. Plastic Reconstructive Surgery. 112. (2): 390, 2003.
6. Pollet J: Three autogenous a struts for nasal tip support. Plastic Reconstructive Surgery. 49(5) 527-532, 1972.
7. Tajima S and Maruyama M: Reverse “U” incision for secondary repair of cleft lip nose. Plastic Reconstructive Surgery. 60: 256-61, 1977.
8. Cusons.P.D et al: A panel based assessment of early versus no nasal correction of the cleft lip nose. British journal of plastic surgery. 46: 7:12, 1993.
9. François: Clinical practice recommendations “Cosmetic and Functional rhinoplasty”. French society for otorhinolaryngology and head-and-neck surgery & French Society for Oral and Maxillofacial Surgery. 91 : 240, 2007.

10. Richard T. Farrior, Edward H. Farrior :Special Rhinoplasty Techniques: Chapter 48.
11. Murrell GL: Auricular cartilage grafts and nasal surgery. Laryngoscope. 2004 Dec; 114(12):2092-102.

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Arterial Stiffness and Parameters of Central Hemodynamics in Adolescents with Different Value of Blood Pressure

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Abstract

Purpose: The aim of the research was to make a correlation analysis of hemodynamic parameters (central aortic pressure and arterial stiffness) in high-school students from boarding school.

Methods: The study included 64 adolescents 15-18 years old. The examination included: 3-times measurement of blood pressure by the method of Korotkov, ambulatory blood pressure monitoring using the device BPLab («Peter TELEGIN», Russia) and applanation tonometry using the unit SphygmoCor («AtCor medical», Australia, Ver.9.0). There were five groups: 1-group – healthy adolescents, 2-group – adolescents with normal BP, but having violence of circadian blood pressure profile, 3-group – adolescents with the «white-coat» hypertension, 4-group – adolescents with arterial hypertension, 5-group – adolescents with «latent hypertension».

Results: In 1-group there is inverse relationship between the aortic systolic blood pressure (SBPao) and heart rate (HR), the HR and aortic pulse pressure (PPao); in 2-group there was direct correlation between PPao and AIXao; in 3-group - between average aortic hemodynamic pressure (BPao) and HR, aortic diastolic blood pressure (DBPao) and duration of left ventricular ejection (ED); in 4 and 5-groups we noted a direct correlation between SBPao and DBPao. The highest values of PWVao were found in the group of adolescents with hypertension – the fourth group. In 1-group there was a negative correlation between AIX and height of the adolescents, in 2-group - the inverse relationship between age and PWVao, PWVao and ED, in 3-group - between PWVao and HR, in 4-group there were no correlations between parameters, in 5-group there were only average correlation links between PWVao and SBPao, and PWVao and average pressure in the aorta.

Conclusion: The results confirmed different relationships between parameters of central hemodynamics and arterial stiffness. Arterial hypertension influences on the value of this parameters. Using this method in pediatric practice helps to optimizing the diagnosis and prevention of hypertension in adolescents.

Keywords: Adolescents, Applanation tonometry, Ambulatory blood pressure monitoring, Arterial stiffness, Central hemodynamics

Introduction:

Numerous studies of arterial hypertension (AH) in adults found that its reasons are to be found in childhood and adolescence. It is known that high stiffness of arteries

in different ways contributes to the increase in aortic systolic blood pressure (SBP) and diastolic blood pressure (DBP), which increases the damaging effect of the pulse wave on the blood vessels of the brain, heart and other

organs, the blood supply is reduced and this increases the load on the myocardium and in the future all this changes contributes to the development of coronary heart disease, heart, kidney failure, stroke. Therefore, the estimation of the parameters of the central aortic pressure (CAP) is important in examining patients with high cardiovascular risk.^{1,2,3} It is known that the main vessels in hypertension are not only the target organ, but it has an independent role in the development and progression of hypertension.^{4,5}

The aim of our research is to make a correlation analysis of hemodynamic parameters (central aortic pressure and arterial stiffness) in high school students from boarding school.

Materials and Methods:

The study included 64 high school students (10-11 classes) from boarding school from 15 to 18 years old (average age – 16,16 years). The examination of them included: three times measurement of blood pressure (BP) by the method of Korotkov, ambulatory blood pressure monitoring (ABPM) using the device BPLab («Peter TELEGIN», Russia) and applanation tonometry using the unit SphygmoCor («AtCor medical», Australia, Ver.9.0). We made a correlation analysis of following central aortic hemodynamic parameters: aortic systolic blood pressure (SBPao), aortic diastolic blood pressure (DBPao), average aortic hemodynamic pressure (BPao), aortic pulse pressure (PPao), aortic augmentation index (AIxao), duration of left ventricular ejection (ED), parameters of arterial stiffness: pulse wave velocity in the aorta (PWVao), augmentation index (AIx). The processing of the data was performed by the program SPSS Statistics 17.0.

Results:

Three times measurement of BP by the method of Korotkov and ABPM were conducted to verify the diagnosis of hypertension and based on the results we made 5 groups of patients. The first group (12,5%) – healthy adolescents, the second group (7,8%) – adolescents with normal BP, but having violence of circadian blood pressure profile. The third group (23,4%) – adolescents with the «white-coat» hypertension. The fourth group (37,5%) – adolescents with arterial hypertension. The fifth group (18,8%) – adolescents with «latent hypertension».

The analysis of the parameters of central hemodynamics in all groups we identified the most significant correlations: in the first group there is inverse relationship between the aortic systolic blood pressure (SBPao) and the heart rate (HR) ($r = -0,70$; $p = 0,004$), the HR and aortic pulse pressure (PPao) ($r = -0,77$; $p < 0,001$); in the second group there was direct correlation between PPao and AIxao ($r = +0,82$; $p < 0,001$); in the third – between average aortic hemodynamic pressure (BPao) and HR ($r = +0,80$; $p = 0,001$), aortic diastolic blood pressure (DBPao) and duration of left ventricular ejection (ED) ($r = +0,76$; $p < 0,001$); in the fourth and fifth groups we noted a direct correlation between SBPao and DBPao ($r = +0,81$; $p < 0,001$ and $r = +0,70$; $p < 0,001$, respectively). Also as a result of applanation tonometry we found average values of PWVao in all groups: the first group - $5,29 \pm 0,24$ m/s, the second group - $4,48 \pm 0,17$ m/s, the third - $5,07 \pm 0,21$ m/s, the fourth - $5,48 \pm 0,13$ m/s, the fifth - $4,88 \pm 0,20$ m/s. All values of PWVao in all groups are in the normal range (5.5 - 8.0 m/s), due to the young age of the participants. However, the highest values of this parameter were found in the group of adolescents with hypertension – the fourth group.

The correlation analysis of the parameters of arterial stiffness showed the following links in groups: in the first group there was a negative correlation between AIx and height of the adolescents ($r = -0,70$; $p < 0,001$) in the second group - the inverse relationship between age and PWVao ($r = -0,88$; $p < 0,001$), PWVao and ED ($r = -0,73$; $p < 0,001$), in the third group - between PWVao and HR ($r = 0,77$; $p < 0,001$), in the fourth group there were no correlations between parameters, in the fifth group there were only average correlation links between PWVao and SBPao ($r = 0,59$; $p < 0,001$), and PWVao and average pressure in the aorta ($r = 0,58$; $p < 0,001$).

Discussion:

The results confirmed that there are different relationships between parameters of central hemodynamics and arterial stiffness, and showed that arterial hypertension influences on the value of this parameters.

Conclusion:

Applanation tonometry can be used to evaluate the parameters of central hemodynamics and arterial stiffness in children of different age groups, the advantage of the method is that it is non-invasive and it helps to highlight the features of the relationships between various hemodynamic parameters. Using this method in pediatric practice contributes to optimizing the diagnosis and prevention of hypertension in adolescents. All these measurements are very popular in general practice, so normal ranges displayed with individual patient results, but this method is new in pediatric practice and there are NO normal ranges for children and adolescents. The prospect of our study is to collect the necessary basis and to determine normal ranges for children and adolescents of all ages.

References:

1. Laurent S., Katsahian S., Fassot C., et al. Aortic stiffness is an independent predictor of fatal stroke in essential hypertension. *Stroke* 2003 Vol. 34: 1203-6.
2. O'Rourke M.F., Safar M.E., Nichols W.W. Pulse wave form analysis and arterial stiffness: realism can replace evangelism and scepticism [letter]. *J. Hypertens.* 2004; 22:1633-4.
3. McEniery CM, Cockcroft JR. Pathogenesis of cardiovascular events in response to high central blood pressure. In: Laurent S., Cockcroft J. Central aortic blood pressure. 2008, 55-60.
4. Safar M. E., Levy B. I. Struijker-Boudier H. *Circulation.* 2003; Vol. 107: 2864-9.
5. Shimizu M., Kario K. *Ther. Adv. Cardiovasc. Dis.* 2008. Vol. 2; no.1: 25-35

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Social Networking and Oral Health Education

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Abstract

Boom in information technology and computer sciences have changed the life style quotient of people. Medical and dental field have not been spared with its influence in academics to microsurgical techniques. The key factor of patient communication has been also made easy with new advances. With advances in technology came the social networking sites, which people are hooked to and are in contact with the near and dear ones. These sites have become a channel for many companies to advertise, recruit, educate and market their products. What has been the influence of this sector to oral health and especially oral health education has never been pondered especially in developing countries where most of its people live in rural areas. However, we discuss the social networking sites with their influence in health and oral health with emphasis on oral health education which is the hour of need in India with increasing population having access to social networking sites.

Keywords: Social Networking, Websites, Oral Health, Oral health education, Information technology, Media

Introduction:

Over the past two decades communication has changed beyond imagination. Mobile phones, portable computing devices and the internet have all become widely accessible and provide entirely new avenues to access information, connect, and communicate regardless of geographic location. The proliferation of modes and speed of communication and the reflexivity of knowledge all have important implications for health promotion. Individuals continually examine and change their practices in light of incoming information from a variety of sources.^{1,2} How best to present and deliver information in this rapidly changing environment is a key challenge for health promoters.

As the use of newer communication technologies continues to exponentially increase, health promotion will inevitably expand out from the 'old' media (TV, radio, billboards) and into the 'new' (mobile telephones, social networking sites).³ Today almost everyone has web access regardless of age, academics, or economics. We have seen

9-year-olds on planes with smart phones using Skype, and great-grandmothers exchanging photos via e-mail. You can safely assume that most of your target population can find links on the Internet.⁴ While not all information available on the superhighway is true, there are ways to guide your patients to the sites you trust. Hence a review was planned to know how the social networking can have impact on oral health education and the incorporation of this to oral health education.

Methodology:

A thorough search was made on the pubmed and other reliable sources. 35 relevant articles were screened for the eligibility for the manuscript. Among the 35 related articles; 16 articles were reviewed and rest were excluded as they were mainly inconclusive or were repetition of the previous studies. This subject is still in its infancy and less of literature available for the same.

Discussion:

The changing technology, such as telephone networks and the internet, has received attention in medical field applicable to HIV education,^{2,3} supporting isolated and lonely older people,⁴ genetic testing,⁵ fractures,⁶ mental health,⁷ prepartum cardiomyopathy,⁸ diabetes,⁹ child health care,¹⁰ sexual health¹¹ etc. The technologic advances in the digital media, including computers, mobile phones, and the internet, that have greatly expanded opportunities to deliver evidence-based HIV education, prevention, and treatment programs. Behavioural interventions using digital media have been developed in many forms, ranging from complex computer-tailored multimedia interventions that take into account individual behaviours and stages of change to brief untailored video interventions.

Though many websites are present for oral health only two studies have been reported, i.e., one on oral lichen planus,¹² and the other on oral leukoplakia.¹³ One study assessed the web-based training (wbt) on resident knowledge of preventive oral health and compare the addition of hands-on training (hot) to wbt on resident skills, confidence opinions, and practice. The authors concluded that both instructional methods resulted in increase in knowledge, efficacy, and practice of preventive oral health.¹⁴

The main goal of social networking for oral health should be to provide accurate, clear, and concise health information from multiple points of view. Online and off-line behavioural interventions using digital media range from computerized multimedia interventions that take into account individual behaviours to brief untailored video interventions. Numerous web sites facilitate access to care by providing a variety of services, including location of and linkage to testing and treatment sites. Treatment and adherence programs that use online medical records text messaging, paging, and tablet computer-based counselling tools are also being developed. Through a quantitative and qualitative analysis of the web sites offering such tests, it seems that these companies target a triple market based on: the "healthism" which raises health and hygiene to the top of the social values; the contemporary demands of the users to become actual actors of health decisions; and finally on the need for bio-social relationships. These three

commercial strategies underlie various ethical and societal issues justifying a general analysis. It also eliminates the social, language, and cultural barriers that otherwise could impede the effectiveness of oral health education. Text messages are viewed as an acceptable and 'personal' means of health promotion, with participants particularly valuing the informal language. Recipients are more likely to remember and share messages that were funny, rhymed and/or tied into particular annual events.¹⁵

Some of the websites which are already present for oral health education.

- 1) April 25, 2011 -- The ADA has entered into an agreement with Sharecare, an online resource that allows the public to submit health-related questions and have them answered by health professionals, to provide dental-specific expertise to the site.
- 2) Young Dental has produced a brochure to help patients better understand the oral-systemic health link. The brochure can be downloaded free at <http://www.youngdental.com/pdf/OralHealthLit.pdf>, or by visiting the Young Dental site and clicking on the Oral Systemic Health Brochure link.
- 3) The Oral Cancer Foundation has put together a nice web site for professionals and patients alike, www.oralcancerfoundation.org.
- 4) The National Institute of Dental and Craniofacial Research have a web page full of educational resources at <http://www.nidcr.nih.gov/EducationalResources/>.

None of the Indian sites are available for oral health education in true sense. Though some form of oral health information is available on IDA website, not of much interactive education is absent. Most of the websites on oral health in India were more of marketing purpose for individual dental clinics rather than oral health education. Some of the oral networking sites from which oral health education can be channelized are *Facebook, Orkut, Skype, Twitter, Youtube, Likedin, Wyn, Yahoo, Flickr* etc and also through individual websites.

Uses of social networking for oral health education:^{3-5,14-16}

- 1) The opportunity to bring the voice of the dentists to millions of people, providing them with the most credible and trustworthy oral health information there is and helping them achieve optimal oral health.
- 2) Consumers can also ask questions pertaining to cancer, fitness and exercise, and mental health, among other areas.
- 3) It will also engage the public and enhance the recognition and importance of the dentist as the authority on oral health and care.
- 4) Research - Conducting research on social media sites requires deliberate attention to consent, confidentiality, and security.
- 5) Dental dialogues that provide a platform for oral health and health professionals to share knowledge and treatment protocols for systemic diseases related to diseases of the mouth.
- 6) Emotional support of patient in every step.
- 7) Web-based program can contribute to the child health promotion as well as can provide the staff with the insightful child health information
- 8) Targets high-risk population through tailored Internet outreach via chat rooms, social networking sites, and online forums.

Conclusion:

The past few decades have witnessed a dramatic increase in consumers seeking health information online. Mobile phones, in particular SMS, internet (networking sites) offer health promoters an exciting opportunity to engage personally with a huge number of individuals for low cost. The key elements such as message style, language and broadcast schedule are directly relevant to future studies using SMS for health promotion, as well as for future health promotion interventions in other mediums that require short formats, such as social networking sites.¹⁶ There is scope to broaden the use of social networking in oral health education that would engage dentists and dental students in the social construction of knowledge. The time has come for dentists to embrace social networking, because if they don't, they will risk losing an invaluable tool of viral proportions. Oral health promotion

programmes using digital media have great potential to cost-effectively and fastly meet the complex needs of diverse and often underserved populations living with or at high risk of oral diseases.

References:

1. Cole-lewis H, Kershaw T: Text messaging as a tool for behavior change in disease prevention and management. *Epidemiologic reviews* 2010.
2. Bull SS, Breslin LT, Wright EE, Black SR, Levine D, Santelli JS. Case study: an ethics case study of hiv prevention research on facebook: the just/us study. *J Pediatr Psychol*. 2011 feb 3. [epub ahead of print]
3. Chiasson MA, Hirshfield S, Rietmeijer C. HIV prevention and care in the digital age. *J Acquir Immune Defic Syndr*. 2010 dec 15;55 suppl 2:s94-7.
4. Cattam M, Kime N, Bagnall AM. The use of telephone befriending in low level support for socially isolated older people--an evaluation. *Health Soc Care Community*. 2011 Mar;19(2):198-206.
5. Ducournau P, Gourraud PA, Rial-Sebbag E, Bulle A, Cambon-Thomsen A. Direct-to-consumer genetic testing through internet: marketing, ethical and social issues. *Med Sci (paris)*. 2011 Jan;27(1):95-102.
6. Nahm ES, Barker B, Resnick B, Covington B, Magaziner J, Brennan PF. Effects of a social cognitive theory-based hip fracture prevention web site for older adults. *Comput Inform Nurs*. 2010 Nov-Dec;28(6):371-9.
7. Christensen H, Murray K, Caele AL, Bennett K, Bennett A, Griffiths KM. Beacon: a web portal to high-quality mental health websites for use by health professionals and the public. *Med J Aust*. 2010 Jun 7;192(11 suppl):s40-4.
8. Hess RF, Weinland JA, Beebe K. "I am not alone": a survey of women with peripartum cardiomyopathy and their participation in an online support group. *Comput Inform Nurs*. 2010 Jul-Aug;28(4):215-21.

9. Sue Kirkman, M.D., senior vice president, medical affairs and community information, American Diabetes Association; Jan. 24, 2011, Journal of the American Medical Informatics Association, online
10. Kim JS. Development and effect of a web-based child health care program for the staff at child daycare centers. J Korean Acad Nurs. 2010 apr; 40(2):213-24.
11. Gold J, Lim MS, Hellard ME, Hocking JS, Keogh L. What's in a message? Delivering sexual health promotion to young people in australia via text messaging. BMC public health. 2010 dec 29;10:792.
12. López-Jornet P, Camacho-alonso F. The quality of patient-orientated internet information on oral lichen planus: a pilot study. J Eval Clin Pract. 2010 oct;16(5):883-6
13. López-Jornet P, Camacho-Alonso F. The quality of internet information relating to oral leukoplakia. Med Oral Patol Oral Cir Bucal. 2010 sep 1;15(5):e727-31.
14. Talib N, Onikul R, Filardi D, Simon S, Sharma V. Effective educational instruction in preventive oral health: hands-on training versus web-based training. Pediatrics. 2010 mar;125(3):547-53. Epub 2010 feb 1.
15. Eaton KA, Reynolds PA, Cox MJ. Top of the pops--CD-ROM and DVDs in dental education. Br Dent J. 2008;204(4):203-7.
16. Demirjian A, David B. Learning medical and dental sciences through interactive multi-media. Medinfo. 1995;8 Pt 2:1705.

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Polyamides in Dentistry

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Abstract

Thermoplastic resins have been used in dentistry for over 50 years. Since that time their applications have continued to grow, and the interest in nylon based materials have increased. With the development of new properties, there are certain to be additional new applications for thermoplastic resins in the future, to help patients with damaged or missing teeth. The dentists have to meet growing demands for prosthetic rehabilitation due to population aging and higher requirements on the quality of life. Herein in this article we will be discussing in detail properties of nylon based materials and their various implications in dentistry.

Keywords: Nylon, Injection molded, Denture, Resin

Introduction:

Thermoplastic resins have been used in dentistry for a very long period of time. These resins may be repeatedly softened by heating and hardened by cooling without undergoing a chemical change. They may be considered as being composed of bundles of chainlike molecules (called polymers) of many different lengths and molecular weights. They can be broadly classified as thermoplastic acetal, thermoplastic polycarbonates, thermoplastic acrylic and thermoplastic nylon.¹

Thermoplastic acetal as a homo-polymer has good short term mechanical properties, but as a copolymer, acetal has better long-term stability. These resins resist occlusal wear and are well suited for maintaining vertical dimension during provisional restorative therapy. While stronger, acetal does not have the natural translucency and vitality of thermoplastic acrylic and polycarbonate, thus these materials might offer better results only for short term temporary restorations. Thermoplastic polycarbonates are a polymer chain of bisphenol-A

carbonate. Polycarbonates are ideally suited for provisional crowns and bridges but not suitable for partial denture frameworks.

Thermoplastic acrylic has been used in dentistry for many years in the form of temporary crowns and thermal polymerized as baseplate material for partial and complete dentures. Thermal polymerized PMMA demonstrates high porosity, high water absorption, volumetric changes and residual monomer. They have poor impact resistance, tensile and flexural strength for a variety of applications. Thus, improvised thermoplastic nylon can be a useful alternative to polymethylmethacrylate in special circumstances where higher flexibility, higher resistance to flexural fatigue, higher impact strength is required.²

Although clinician's skills and experience play a major role in designing and fabricating an optimum prosthodontic restoration, the selection of denture resins is equally important, especially when the patient has to use the prostheses for long period of time.³ Nylon polyamides were first introduced in the construction of denture bases in 1950s.⁴ Nylon is a generic name used for certain types of thermoplastic

polymers belonging to the class known as polyamides. Nylon polyamide was developed as a result of the classic research of W.H. Carothers and associates of the Du Pont Chemical Co. of America, carried out during the company's search for a synthetic fiber forming material (1928 – 1938).⁵ These polyamides are produced by the condensation reactions between a diamine and a dibasic acid. The use of nylon as a denture base material has been described in the literatures in the 1950s.⁵⁻⁷

In 1950's as compared to polymethylmethacrylate, nylon material were rugged, less rigid, highly resilient, resistant to abrasion and practically unbreakable. However due to certain disadvantages of the early forms of nylon polyamides such as tendency of base color to deteriorate, stain, high water sorption, development of surface roughness after a few weeks' wear and difficulty in processing, its use was restricted to limited conditions such as repeated denture fractures, proven allergy to polymethylmethacrylate, lack of neuromuscular coordination and construction of orthodontic appliances.⁸⁻¹⁰

In order to overcome these shortcomings, Nylon with relatively low water sorption levels and melting points, were developed. It was further modified by reinforcement with glass fiber¹⁰ and glass spheres⁵ to increase its potential use as a denture base material. This improvised material showed better strength, stiffness, dimensional stability and lower water sorption. With the progress in technology and understanding of material, improvised nylon polyamides have surpassed its limitations and are finding novel applications in the fabrication of removable partial dentures, small to medium sized complete dentures, occlusal splints etc. Their usage as denture base material is still limited due to limited facilities and lack of knowledge of these materials. Herein in this article we will be discussing in detail the properties of nylon based materials and their various implications in dentistry.

Properties

Physical Properties of the Nylons

Nylon is a crystalline polymer whereas polymethyl methacrylate is amorphous. Thus in solid nylon there is more or less ordered parallel packing of the long chain molecule which is due to strong attractive forces between the chains. This crystallinity account for the nylon characteristics of lack of solubility in solvents, high heat resistance, and high strength coupled with ductility. The outstanding features of the nylons are their toughness, low density, abrasion resistance, higher melting point and resistance to chemical attack.

Since nylon is insoluble in almost all common solvents it cannot be dough moulded by usual dental techniques, but molten material must be injected into the flask under pressure. The high mould shrinkage is a serious issue. The flexibility coupled with its strength, enables it to resist all normal attempts to fracture. Previous workers have criticized the flexibility of nylon on the basis that this flexibility can lead to uneven loading of the supporting mucosa and bone particularly in the mandible.^{4,5,11}

Mechanical Properties of the Nylon

The chief advantage of nylon lies in exceptional mechanical properties of resistance to shock and repeated stressing, it has higher fatigue resistance compared to PMMA. Nylon has higher fatigue resistance than polymethyl methacrylate, although no comparative data under mouth conditions are yet available.⁵ Though nylon has superior mechanical properties than any other non metallic base yet there are some serious limitations such as processing difficulties and dimensional changes.^{12,13} The chief advantages of nylon denture bases are strength and lightness. The ultimate tensile strength of nylon AI00/M is **10,000-11,500lb./sq. in.** as compared with 7,000-8,000 lb./sq. in. for acrylic. This makes skeleton denture designs, which would be impracticable if made in acrylic, a feasible proposition when made with nylon. It has higher abrasion resistance, elastic memory, creep resistance and is conductive to cyclic stress.^{5,12} These denture

base resins have lower flexural strength at the proportional limit, low elastic moduli along with good fracture resistance.^{14,15}

Dimensional Changes

Nylon is hygroscopic, its moisture content varies slowly with the surrounding conditions. On immersion in water the material swells, i.e. there is linear expansion.⁵ Processing the denture base materials produced unequal deformation in different dimensions (anterior-posterior and cross-arch). The magnitude of this dimensional change depends on the conditions of moulding, shape of the mould, and direction in which it is measured.¹³

Thermal Properties, Bacterial Growth, Staining

Nylon has low coefficient of linear expansion and galvanic conductance.^{5,12} According to Abuzar et al polyamide denture base material when polished with conventional laboratory technique became more smoother than PMMA when using the same polishing technique. However the surface roughness of polyamide was well within the accepted norm and was clinically acceptably smooth after conventional polishing by lathe.¹⁶ It seems likely that at least part of the surface roughness may be due to growth of bacterial plaques on the surface of the nylon. In few cases smear layer were made from surface scrapings of the nylon denture bases and of the acrylic teeth on the bases which resulted in clinically noticeable staining.^{4,6,10,17,18}

The highest *Candida* species biofilm growth was shown to occur on polyamide resin when compared with PMMA.¹⁹ Although flexible resins present advantages in terms of esthetics and comfort, studies assessing chromatic and micro hardness alterations of these materials are still scarce in the related literature.²⁰

Flexibility

Flexibility is a property, possessed by nylon, which is not usually considered to be advantageous in denture base materials. It can, however, prove to

be a useful property in certain types of partial dentures while being unsuitable for other types.

The flexibility of nylon varies greatly depending on the type of moulding powder used, temperature of injection, pressure of injection surplus nylon remaining in the cylinder after injection was found to be brittle. This was attributed to the fact that it had not been under pressure when it set. More recent grades of nylon with low water absorption have proved to be more flexible. It may be worth mentioning that full dentures made of nylon are not flexible since they are usually too thick to display this property.⁶

It was found that clasps made of nylon had to be rather bulky in order to function efficiently. Thin clasps which were adequate for retention when the denture was first fitted tended to warp away from the teeth after a few weeks wear. This was probably due to slow release of strains which had been induced during moulding. Owing to the flexibility of the base it was possible to utilize undercuts, for retention, which would normally have to be blocked out on an acrylic or metal base.⁶

Thermoplastic resins for non-metal clasp dentures exhibiting low water sorption and solubility offer hygienic advantages. Since they have a low modulus of elasticity and are easily manipulated, these materials make it possible for larger undercuts to be used for retention compared to acrylic resin.¹⁸

Flexibility can be advantageous in conditions when the buccal undercut on the maxillary tuberosity are present together with reduced width of the buccal vestibule.²¹ Patient with systemic sclerosis and those who suffers from scarring in the oral and facial areas due to disease, trauma, or burning injuries, it is determined that long-term comfort and function could be achieved only through the use of a flexible removable partial denture.²² Nylon is also an effective method for correcting gingival recession by fabricating a flexible gingival epithesis. However, discoloration of the epithesis still remains a problem.²³

Comparison between injection moulded and compression-moulded resins:

Nylon has unusual injection moulding characteristics since it melts sharply at a relatively high temperature to a mobile liquid in contrast to the more usual behavior of most other thermoplastics which display a gradual softening over a broad temperature range to a viscous fluid. Little increase in mobility of the melt is obtained by heating nylon above its melting point. For the same reason the material has been employed in the solid state, thus reducing the inclusion of air which occurs when granules are used. The mobility of molten nylon is the reason why heavy injection pressure is not necessary.^{5,6,13} It is interesting to note that injection-molded resins were more resilient than their compression-molded counterparts. Injection-molded resins generally require a greater monomer content to improve flow characteristics and facilitate filling of the mold cavity. This often results in additional unreacted monomer within a polymerized resin. In turn, the unreacted monomer may serve as a plasticizer, thereby increasing the resiliency of the polymerized denture base resin. The increased amounts of unreacted monomer may account for at least part of the resiliency in the injection-molded resins. The completeness of polymerization is significant for 2 major reasons; firstly, the degree of polymerization affects the mechanical and geometric properties of resultant prostheses. Second, unreacted monomer may produce undesirable effects in the human body. Consequently, resins displaying greater degrees of polymerization may provide substantial clinical advantages.¹³ The injection molding technique also provides a long working time before polymerization was complete, and this helps to improve the penetration of resin into space between fibres.^{11,24,25}

Failures of Nylon as Denture Base

They can therefore be ascribed due to the following causes; the material has a very high water sorption and is rather flexible. Processing conditions are generally far from optimum, particularly mould temperature and injection pressure.¹⁰

Improvements in nylons necessary for intra-oral potential

Processing must be under precise control, since the sensitivity of polyamides to method of molding can give up to a 50 percent variation in crystallinity, which markedly affects the mechanical properties. In 1962 there was a further advance in the polyamide field with the introduction of glass reinforcement of base nylon, of the 'short-fibres' types. The success of this has been largely due to the silane-treatment of the glass fibres so that the bonding occurs with the base material. Both the strength and the stiffness are increased, the tensile strength being doubled and the modulus of elasticity becoming three and half times greater. The coefficient of linear expansion is reduced to a quarter of its previous value and this would enhance dimensional stability both in processing and in use. The water sorption value is lowered by a diluent effect to 1.2 percent.¹⁰

According to Katsumata et al silica-coating by Rocatec system was effective in improving the bond strength of nylon denture base polymer to autopolymerizing repair resin.²⁶ Polyamide has some attractive advantages, but will require modification to produce consistently better properties than current PMMA materials.¹⁵

Dental applications for thermoplastic resins

Current dental applications for thermoplastics resins originally involve:^{27,28}

1. Preformed partial denture clasp
2. Flexible tooth born partial denture framework
3. Single cast partial dentures
4. Temporary crowns and bridges
5. Gum veneers
6. Space maintainers
7. Immediate dentures
8. Replacement of missing teeth in pediatric cases
9. Precision attachment
10. Combination with metal framework
11. Occlusal appliances
12. Implant abutments
13. Orthodontic and sleep apnea appliances
14. TMJ appliances

Conclusion

The dentists today have to meet growing demands for prosthetic rehabilitation due to population aging and higher requirements on the quality of life. That means higher demands on the functional reliability of dental appliances, their aesthetical and biological properties. Dental research teams and industry are looking for new materials with properties very similar to natural oral tissues, requiring simple handling. The new materials involve new technologies and devices which are being introduced into practical dental work from cosmic and other hi-tech projects. Modern technologies bring both expensive systems (ceramics, titanium, dental implants), and cost-saving solutions (plastic materials). The offer of materials and technologies is continuously growing on the dental market. Time and practical experience will help us in the choice of the best-quality materials and working procedures for prosthetic rehabilitation.

Thermoplastic resins have been used in dentistry for many years. During that time the applications have continued to grow and the interest in these materials by both the profession and the public have increased. The materials have superior properties and characteristics and provide excellent esthetic and biocompatible treatment options. With the development of new properties, there are certain to be additional new applications for thermoplastic resin in the future, to help patients with damaged or missing teeth.²⁹

References:

1. Jacob John, Shivaputrappa A. Gangadhar and Ila Shah. Flexural strength of heat-polymerized polymethyl methacrylate denture resin reinforced with glass, aramid, or nylon fibers. *J Prosthet Dent* 2001; 86: 424-7.
2. Schoonover IC: Some properties of two types of resins used for dentures: *Jour A.D.A & D. Cos*, Vol 25, September 1938: 1487-1500.
3. Singh JP et al. Flexible denture base material: A viable alternative to conventional acrylic denture base material. *Contemp Clin Dent*. 2 (2011), 313.
4. Matthews E, Smith DC. Nylon as a Denture Base Material. *Br Dent J*, 98 (1955), 231.
5. MacGregor R et al. Recent experiences with denture polymers. *J Dent*, 12(1984), 146.
6. Watt DM. Clinical assessment of nylon as a partial denture base material. *Br Dent Jour*, 98 (1955), 238.
7. Hallett GEM, Farrell JH. Nylon denture base. *Dent Pract*, 6 (1956), 239.
8. Douglas M. Nylon as a Denture Base Material. *The Dent Prac Dent Rec*, XIII (1962), 142.
9. G. H. Roberts. Nylon in Orthodontics: An Experiment. *Br Dent Jour*, 100 (1956), 113.
10. Anne S. Hargreaves. Nylon as a Denture - Base Material. *The Dent Prac Dent Rec*, 22 (1971), 122.
11. Kanie T et al. Flexural strength properties of denture base polymers reinforced with a glass cloth-urethane polymer composite. *Dental Material*, 20 (2004), 709.
12. Phoenix RD et al. Evaluation of mechanical and thermal properties of commonly used denture base resins. *J Prosthodont*, 13(2004)17.
13. Parvizi A et al. Comparison of the dimensional accuracy of injection-molded denture base materials to that of conventional pressure-pack acrylic resin. *J Prosthodont*. 13 (2004) 83.
14. Hamanaka I, Takahashi Y, Shimizu H. Mechanical properties of injection-molded thermoplastic denture base resins. *Acta Odontol Scand*. 69 (2011), 75.

15. Ucar Y, Akova T, Aysan I. Mechanical Properties of Polyamide Versus Different PMMA Denture Base Materials. J Prosthodont. 21 (2012), 173.
16. Abuzar MA et al. Evaluating surface roughness of a polyamide denture base material in comparison with poly (methyl methacrylate). J Oral Sci. 52 (2010), 577.
17. Huggett R, MacGregor AR, Graham J. The use of nylon as a denture-base material. J Dent, 14 (1986), 18.
18. Takabayashi Y. Characteristics of denture thermoplastic resins for non-metal clasp dentures. Dent Mater J. 29 (2010), 353.
19. Freitas FS et al. Efficacy of denture cleansers on *Candida* spp. biofilm formed on polyamide and polymethylmethacrylate resins. J Prosthet Dent. 105 (2011), 51.
20. Goiato MC et al. Effect of accelerated aging on the microhardness and color stability of flexible resins for dentures. Braz Oral Res. 24 (2010), 114.
21. Lowe LG. Flexible denture flanges for patients exhibiting undercut tuberosities and reduced width of the buccal vestibule: a clinical report. J Prosthet Dent. 92 (2004), 128.
22. Samet N et al. Flexible, removable partial denture for a patient with systemic sclerosis (scleroderma) and microstomia: A clinical report and a three-year follow-up. Gen Dent. 55 (2007), 548.
23. Zhao X, Cao J, Zhang Y. Clinical application of a kind of flexible gingival epithesis material. Hua Xi Kou Qiang Yi Xue Za Zhi. 21 (2003), 324.
24. Phoenix RD et al. Evaluation of mechanical and thermal properties of commonly used denture base resins. J Prosthodont. 13 (2004), 17.
25. Karacaer O et al. The effect of length and concentration of glass fibers on the mechanical properties of an injection- and compression-molded denture base polymer. J Prosthet Dent, 90 (2003), 385.
26. Katsumata Y et al. Bonding strength of autopolymerizing resin to nylon denture base polymer. Dent Mater J. 28 (2009), 409.
27. Yunus N et al. Some flexural properties of a nylon denture base polymer. Journal of Oral Rehabilitation, 32 (2005), 65.
28. Hallett GEM, Farrell JH: Nylon Denture Base Report Of A Dental Experience. The Dent Prac Dent Rec, VI(1956), 239 Price CA.
29. A history of dental polymers. Aust Prosthodont J, 8 (1994), 47.

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Review and Ethical Analysis of Paper “Falls among elderly population”

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Abstract

Background: Falls are a common and often devastating problem among the elderly population, causing a tremendous amount of morbidity, mortality. Different intervention modalities that result in decrease in the number of falls have been studied, these include exercise, medication reduction, support services and home hazard modifications. Similarly, multiple intervention programs also showed promising results in fall reduction.

Context: Ethical analysis of falls among elderly population especially in Day and colleagues research study.

Method: Review and ethical analysis of the topic of falls among elderly population. The main paper reviewed in is “Randomised factorial trial of falls prevention among older people living in their own homes”, by Day and colleagues

Results: Exercise interventions showed significant effect on fall incidence ($p < 0.05$), cited as the most important fall reduction intervention. Home hazard and vision interventions showed no significant effect. Overall, a combination of all three interventions showed greatest effect by reducing falls by 14%.

Conclusion : The elderly is becoming increasingly important. The elderly are more prone to falls and the resulting injuries can have serious implications on quality of life. Whilst the examples I provided illustrate that research into the subject is ongoing, one must appreciate that the full effects have yet to be seen. Future research needs to focus on replicating fall prevention studies like Day and colleagues in order to develop strong evidence for change and implementation of interventions into clinical practice.

Keywords: Falls in elderly, falls and prevention programs, fall statistics in Australia.

Introduction:

According to Rubenstein, “Falls are a common and often devastating problem among older people, causing a tremendous amount of morbidity, mortality and use of health care services including premature nursing home admissions (1, p. 37).” Thus, falls are a complex, multi-faceted issue consisting of medical, social, and economic components. Medically, the combination of a high incidence of falls and an increased susceptibility to

injury makes the elderly population vulnerable to falls.¹ Diseases such as osteoporosis and age-related physiological changes (slowed reflexes) serve to further increase risk of injury after even a minor fall.¹ Additional risk factors for falls include increasing age, weakness, unsteady gait, confusion, and certain medications.² More specifically, drugs that increase risk of falls are sedative-hypnotic, anxiolytic, Tricyclic antidepressants, and antihypertensive medications.³ The medical consequences

of falls depend not only on an individual's risk factors but the manner in which the person falls. Falls can result in fractures, head injuries, delayed healing, increased risk of subsequent falls, and post-fall anxiety syndrome.^{1, 2} Socially, falls can result in limitations in performing activities of daily living, increased caregiver burden, and decreased quality of life.² Economic consequences are extensive due to loss of independence and the cost of medical care.³ Injuries from falls are financially draining both for the elderly and health care systems around the world.^{3, 4} Consideration of the complexity of the problem of falls has led Day and colleagues to address these issues by studying the effectiveness and interaction of three fall prevention interventions, namely, group based exercise, home hazard management and vision improvement.⁵

At the time of research design by Day and colleagues, statistics indicated that increasing numbers of older adults in Australia were dying from accidental falls and suffering from distressing and costly injuries.⁶ Known factors included the increased susceptibility of older adults to falls, risk factors included muscle weaknesses, balance problems, poor eyesight and home hazards.⁷ Over the past 10 years, sufficient evidence has demonstrated the importance of various interventions to reduce falls, which has sparked international interest and funding for fall prevention programs.⁸ Single interventions such as exercise, medication reduction, support services and home hazard modifications all resulted in decreased falls. Similarly, multiple intervention programs also showed promising results in fall reduction.⁵ However, it was unclear whether multiple intervention programs were more effective in preventing falls than single, targeted interventions.⁸ Further unknowns included the interactions between specific interventions and the relative importance of each intervention in decreasing falls, which gave rise to Day and colleagues' study question.⁵

Prior to the timeframe 1991-1998, hospitalizations due to fall related injuries reached alarming proportions necessitating extensive health care resources.⁴ Fall prevention was a major public health issue in clinical practice due to the aging population. Subsequently, the focus shifted towards using health promotion strategies to prevent falls.⁴ In 2001, a survey of fall prevention services in Australia showed initiatives towards reducing falls and related injuries, conducting multidisciplinary assessments

of fall risk and developing individualized risk management plans.⁶ Implications for practice have emerged due to the division of funding between allied health (government funded) and general practitioners (fee-for service). As a result, making the clinic accessible to the target population and linking the two providers together seamlessly has been a challenge.⁶ Limited health care resources and the lack of consensus over the most effective fall prevention programs have created barriers to the advancement of clinical practice.^{6, 8}

Method:

The aim was to review and ethically analyze the topic of falls among elderly population. The main paper reviewed in is "Randomised factorial trial of falls prevention among older people living in their own homes", by Day and colleagues.⁵ Within the search strategy, various databases and methods were utilized to acquire relevant research for appraisal of Day and colleagues study. The main databases used were the Google scholar search engine, ProQuest medical library database, Ovid Full-Text Journals database and books. The first two databases mentioned above yielded the largest number of useful sources at 8 references. While, the research books were important in carrying out the analysis of the research paper. Search methods have been arranged below in tables to illustrate the search strategies for each source more effectively. Numbers in brackets refer to the reference list following this section. Search strategies for important references have been outlined, however, to avoid redundancy not all listed below but are included in the reference list.

Google Scholar Search Engine was searched:

Stage	Search Terms	Articles	Comment
1	Falls and older people	318, 000	Numerous articles, some relevant: (3) in reference list.
2	Falls in elderly in advanced search box, date 1990- 2002	35, 800	Large number articles found, some relevant.
3	Used related articles option for journal article #3 of 35, 800	101	Less articles, more relevant #6 useful: (7) in reference list.
4	Falls and prevention programs	125, 000	Large amount of relevant articles, #2 relevant: (13) in reference list.
5	Lesley Day and falls	26, 300 but cited 146 times by other sources.	Large amount of articles, only first one relevant: (5) in reference list.
6	Fall statistics in Australia	331, 000	Relevant sources.
7	Clicked on related articles of #1 of 331, 000	101	Relevant sources. #1 applicable: (4) in reference list.

ProQuest Medical Library was searched:

Stage	Search Terms	Articles	Comment
1	Falls and Prevention	1260	General keyword search; majority not relevant
2	Under suggested topics: Falls and prevention again	58	Relevant articles; #7 was highly relevant: (1) in reference list.
3	Same search terms as previous but continued searching through articles till end.	58	Relevant articles; #49 was highly relevant: (2) in reference list.
4	Narrowed search using terms: older people	42	Mainly same articles
5	Falls and Australia	119	Not relevant
6	Under suggested topics: Australia (location) and Falls	5	More relevant articles: #2 useful: (6) in reference list.

Ovid Database (Full-Text) was searched:

Stage	Search Terms	Articles	Comments
1	Falls and Australia, limited to full text articles	126	Articles not very relevant.
2	Falls and statistics in Australia & Falls statistics and Australia	Both yielded 157	Articles not very relevant.

Books:

Two research textbooks (9-10 in reference list) were purchased from Clarendon Medical Bookstore, in order to enhance analysis of the study by Day and colleagues.

Results:

Exercise interventions showed significant effect on fall incidence ($p < 0.05$), cited as the most important fall reduction intervention.⁵ Home hazard and vision interventions showed no significant effect. Overall, a combination of all three interventions showed greatest effect by reducing falls by 14%.⁵ The question left unanswered was, what interactions were present between interventions and why? Answering this query would be important in addressing the general research questions and would be possible with existing research data. Gender was another unrecognized factor that could potentially skew results due to differences in muscle mass and exercise capability between sexes. To address gender differences, a stratified sample or a hierarchical regression analysis could be utilized to look at gender separately.^{9,10}

Findings have shed light on the effect of exercise, home hazards and visual acuity interventions on falls in the elderly. Exercise alone warrants further investigation into specific exercises to reduce falls.^{11,12} Knowledge of these interventions can help physicians integrate fall prevention strategies into practice. Risk factor awareness facilitates patient screening for referral to fall programs. Practice implications include the fact that findings are not applicable to the general older adult population. Another important consideration is cost effectiveness, as insufficient funding may prevent implementation into practice.^{5,8}

The study concludes that exercise and a combination of three interventions most significantly reduces falls in older adults.⁵ While the researchers' conclusions are justified, problems with sampling,

reliability, validity, failure to address interventions interactions and gender differences may weaken the significance of findings.⁵ Future research needs to focus on strengthening research methodology in order to prevent these issues from compromising findings.

Discussion:

The population selected for Day and colleagues' study was adults ≥ 70 years old, which was consistent with the literature.^{1,5} However, comparison between the study group and general population revealed a higher proportion of Australian born person's aged 70-74, rating health as good to excellent in the study.⁵ Thus, over-representation of person's aged 70-74 and under-representation of those > 74 were noted. Evidence suggests that persons > 80 are at higher risk for falls than younger counterparts.⁸ Consequently, results are applicable to older adults sharing similar characteristics as the study group but are not representative of the entire older adult population.⁵

The sampling method recruited participants via invitation letters and telephone calls to persons ≥ 70 years old on the Australian electoral roll.⁵ In random sampling, all members of the target population must have an equal chance of being selected.⁹ Incomplete randomization occurred because one recruitment strategy used was local publicity and general practitioners, which could have biased results by obtaining a higher functioning sample. Sampling bias was an issue due to over-representation of persons aged 70-74, with no statistical corrections employed.^{9,10} Restrictive exclusion criteria eliminated high-risk persons (cardiac, respiratory or psychiatric

illnesses), which may have influenced fall results.⁵ Non-response¹⁷ and attrition rates^{11, 9} were low and did not significantly affect results.^{5, 9} The sample size of 1090 was large enough to draw reliable conclusions, as 914 individuals were needed to detect a 25% reduction in annual falls.⁵ Nevertheless, incomplete randomization, sampling bias and restrictive exclusion criteria limited applicability of findings.

Group based exercise, home hazard management, and vision improvement were variables supported by research evidence and local government. Factors were relevant to the study question enabling assessment of the efficacy of multiple interventions and interactions.⁵ Variables were measured quantitatively using continuous measures, such as muscle strength, number of hazards, vision and number of falls.^{5, 9} Utilizing this approach lends itself to statistical analysis and can also assess self-reported falls using a multi-factorial design to identify interactions between interventions.^{9, 10}

Independent variables consisted of exercise condition, home hazards and vision. Exercise condition was continuous because muscle strength and balance were measured quantitatively.⁵ subsequently, it was a reliable and valid measure that provided consistent results and measured what was intended.⁹ Conversely, subjective measurement of home hazards indicated a lack of reliability and validity and the potential for construct validity issues to arise as the instrument failed to measure the intended concept.⁹ Problems emerged with vision, as not all patients required a referral to a physician⁵, leading to reliability and translational validity concerns.⁹ Number of falls was the dependent variable measured by participants. Self-report bias was possible because subjects were not blinded to intervention groups resulting in under-reporting of falls.⁵ Enlisting a second party to confirm falls could potentially eliminate this bias. All relevant outcomes were measured with the exception of fall intensity. Assessment of this factor would allow severity of injuries and groups with highest and lowest intensities to be determined and analyzed.

Findings support exercise as a means to reduce falls in the elderly. Previous research has acknowledged exercise as an important part of a myriad of intervention techniques. However, recent literature suggests that exercise is the single most important factor in decreasing falls.¹³ Although

it is difficult to implement changes in the clinical setting, more emphasis is being placed on increasing the physical activity of the elderly to prevent falls. Currently, organizations are assessing the feasibility and cost effectiveness of implementing the interventions outlined in the paper.¹³

Following publication of Day and colleagues study, several studies were conducted to reduce falls among the elderly in Australia and internationally. One study by the American Geriatrics Society examined the efficacy of a community-based program to reduce falls. Cost effectiveness, overall success of the program, and the number of elderly the program could benefit were additional factors assessed.¹³ subsequently, the Stepping On program reduced the number of falls by 31% among elderly Americans.¹³ The Australian article cited provided the means of best intervention - physical exercise, and this is what the program aimed to increase, along with other factors including regular visual screening and medication review for the elderly.¹³

Another study carried out by Tse reviewed the effect of environmental changes on the number of falls among the elderly. The study reviewed previous studies from 1993 up until 2004 concerning fall prevention among the elderly and included up to eighteen articles. The aim was to emphasize the role of different environmental modifications, either at one's home, occupation, and/or environment.¹⁴ Although, some environmental modifications did not reduce the number of falls (bed alarms), other interventions such as wearing slipper socks at night reduced number of falls. Tse concluded that more research is necessary in the field of occupational therapy, as there is evidence that environmental changes and interventions reduce falls.¹⁴

Conclusion:

It is no secret that the world's population is becoming increasingly older, so it's no surprise that care for the elderly is becoming increasingly important. The elderly are more prone to falls and the resulting injuries can have serious implications on quality of life. It can be said that the publication of Day and colleagues research has served as a catalyst for change in the way falls prevention in the elderly has been viewed over the years. Since its

publication, this paper has been cited at least 146 times, indicating that its findings were of value to current practices.⁵

The previously mentioned articles have referenced the data and results identified in Day and colleagues research. As a result, it has not only been of benefit to the Australian elderly community, but also globally with renewed focus on the effects and importance of various strategies to prevent falls. Whilst these examples illustrate that research into the subject is ongoing, one must appreciate that the full effects have yet to be seen. In conclusion, future research needs to focus on replicating fall prevention studies like Day and colleagues in order to develop strong evidence for change and implementation of interventions into clinical practice.¹⁵

References:

1. Rubenstein LZ. Clinical risk assessment, interventions and services: Falls in older people: epidemiology, risk factors, and strategies for prevention. *Age and Ageing* 2006; 35(2): 37-41.
2. Fuller GF. Problem-oriented diagnosis: Falls in the elderly. [Online]. American Association of Family Physicians 2000 April 1 [cited 2008 November 6]. Available from: URL: <http://www.aafp.org/afp/20000401/2159.html>
3. Lord SR, Sherrington C, Mens HB. Falls in older people: Risk factors and strategies for prevention. [Online]. University of Cambridge; 2001. [cited 2008 November 6]. Available from: URL: <http://assets.cambridge.org/97805215/89642/sample/9780521589642ws.pdf>
4. Carmen J, Cripps R. Falls by the elderly in Australia: Trends and data for 1998. *Injury research and statistic series* 2001 February; 6: 1-31.
5. Day L, Fildes B, Gordon I, Fitzharris M, Flamer H, Lord S. Randomised factorial trial of falls prevention among older people living in their own homes. *British Medical Journal* 2002 July 20; 325: 1-6.
6. Houghton S, Birks V, Whitehead CH, Crotty M. Experience of a falls and injuries risk assessment clinic. *Australian Health Review* 2004 December 13; 28 (3): 374-382.
7. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. *N Engl J Med* 1988; 319:1701-1707.
8. Campbell AJ, Robertson MC. Rethinking individual and community fall prevention strategies: a meta- regression comparing single and multifactorial interventions. *Age and Ageing* 2007; 36: 656-662.
9. Bowling A. Research methods in health: investigating health and health services. 2nd ed. United Kingdom: Open University Press; 2002.
10. Babu AN. Clinical research methodology and evidence-based medicine: the basics. United Kingdom: Anshan Limited; 2008.
11. Hogan JM. Cognitive and Emotional benefits of exercise may mediate fall reduction. *British Medical Journal* 2002 July 20; 325(128).
12. Simey PW. Specific exercise is the key. *British Medical Journal* 2002 August 15; 325 (128).
13. Lord SR, Tiedemann A, Chapman K, Munro B, Murray SM. The effect of an individualized fall prevention program on fall risk and falls in older people: A Randomized Controlled Trial. *Journal of the American Geriatrics Society* 2005 June 14; 53 (8): 1296-1304.

14. The environment and falls prevention: do environmental modifications make a difference? *Australian Occupational Therapy Journal* 2005 December; 52 (4): 271-281.
15. Bloem BR, Steijns JAG, Smits- Engelsman B. An update on falls: Neuro-ophthalmology and neuro-otology. *Current Opinion in Falls* 2003 February; 16 (1): 15-26.

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Diagnosis and Management of a 7-year Old Child with an Autism Spectrum Disorder (ASD) in Bahrain: A Case Study

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Abstract

Autism Spectrum Disorders (ASDs) are a group of neurodevelopmental disorders characterized by impairments in 3 domains: communication, social interaction and repetitive behaviours. It is typically diagnosed by 2-3 years of age. This paper presents a case that received late diagnosis of an ASD, and discusses the procedures in which ASDs are diagnosed and managed in Bahrain. It also addresses the challenges faced by healthcare professionals and families in that field. Several factors contributed to the late diagnosis of this child, and that resulted in delayed access to early intervention centers. The options, on the other hand, are very limited due to the shortage of such centers.

Keywords: Autism, Delayed diagnosis, Bahrain.

Introduction:

Autism spectrum disorders (ASDs) are a group of neurodevelopmental disorders characterized by impairments in three domains: social interactions, verbal and non-verbal communication, and preference for a repetitive interest or behavior.¹ There are three types of disorders classified under the Autism Spectrum Disorders according to the DSM-IV-TR: Autistic disorder, Asperger's disorder and Pervasive Developmental Disorder Not Otherwise Specified (PPD-NOS). Autistic disorder is further classified according to its severity to mild, moderate and severe. The Center for Disease Control and Prevention (CDC) estimates that about 1 in 88 children has been identified with an autism spectrum disorder (ASD) in the United States.² In this paper, the terms Autism and Autism Spectrum Disorders (ASDs) are used interchangeably.

It has been found that diagnosing autism between ages 2 and 3 years is quite reliable when healthcare professionals interpreted standard criteria for autism. However, many children do not receive their diagnosis until much later.³ The importance of early diagnosis lies in the outcomes of early access of appropriate services and early intervention. Research found that preschool children

with more than 2 years of intervention for an ASD performed much better than children who began the same interventions at older age. Those improvements included increases in developmental progress and intellectual performance.⁴

One of the most notable interventions is Applied Behaviour Analysis (ABA). It is an intensive behavioral program that incorporates the concepts of Operant conditioning through the use of reward system in behavioral modification. Other interventions include TEACCH and Picture Exchange Communication System (PECS) in which visual cues are utilised in educational settings. Moreover, children with autism may benefit from occupational therapy, physiotherapy and sensory integration therapy. Some complementary and alternative treatments may offer biological therapies, diets, or chelation for the children, however, there is no evidence regarding the benefit of such interventions. There are no medications to cure autism or treat its symptoms.⁵

Although it is estimated that the prevalence of ASDs in Bahrain is equivalent to the general prevalence of ASDs worldwide, there is no documented epidemiological data to support this estimation. The stigma surrounding the disorder and lack of awareness could have contributed to

the underdiagnosis or late referral of ASDs in the population.⁶ ASDs are mainly diagnosed through the Salmaniya Psychiatric hospital in Bahrain, and the cases are usually brought either through self-referral (parents), private practice or sometimes pediatrics.⁷

This paper presents a patient who received a late diagnosis of an ASD, and discusses the process in which Autism Spectrum Disorders (ASDs) are diagnosed in Bahrain, and the challenges faced by the healthcare sector and community in that field.

Case Description:

A 7-year old Bahraini boy was referred from school due to his poor attention and abnormal behavior. He was reported to be constantly fidgeting, not following instructions and hiding under the desk. He, however, was able to understand lessons and gave correct answers.

The patient is a product of full-term normal vaginal delivery and had normal developmental milestones. He walked at less than one year old, and spoke his first words at 1.2 years old. There were complaints in kindergarten that he didn't mix with other children as he was noted to be alone, and was unable to engage in pretend games. In addition, he tended to repeat after people and flickered with his fingers. The family history was positive for ADHD.

On examination, the child had minimal facial expression, poor eye-eye contact, no social smiling, and was flickering with fingers. He appeared with average dressing and hygiene. When asked questions, he didn't answer any except for his name. He was either quiet or repeated the question after the doctor (echolalia). No significant medical findings noted.

Methods:

Several tools have been used in order to obtain a diagnosis of an ASD in the patient. Those will be described briefly.

1. The Modified Checklist for Autism in Toddlers (M-CHAT); a questionnaire given to the parents and is used as a screening method for children suspected to have an ASD.
2. The DSM IV-TR provides specific criteria for diagnosing each of the three disorders.⁸ This is done

through taking the patient's history in addition to the doctor's own observation.

3. The Autism Diagnostic Observation Schedule (ADOS); is a semi-structured assessment that measures the child's performance in terms of communication, socialization and play.⁹
4. The Childhood Autism Rating Scale (CARS); is a diagnostic tool that was developed to help differentiate children with Autism from those with other developmental delays. It yields a score ranging from non-autistic to mildly autistic, moderately autistic, or severely autistic.¹⁰
5. Wechsler Intelligence Scale for Children- Revised (WISC-R); is an intelligence test for children aged 6-16 years of age. It generates an IQ score that reflects the child's cognitive ability.¹¹
6. Adaptive Behaviour Scale (ABS): This test is equivalent Vineland Adaptive Behaviour Scale but was modified to suit the Bahraini culture. It measures the child's skills in terms of daily activities and independence.

Management:

The M-CHAT screening questionnaire was carried out through interviewing the parents, and a score of 5 was obtained. However, it was repeated at a later stage through re-taking the history from the parents in addition to the doctor's own observation. At this point, the patient received a score of 15 which means he is at elevated risk for ASD. With the DSM IV- TR, he fulfilled 9 of the criteria for diagnosing Autism (a score of 6 is diagnostic). He was advised to be admitted for further evaluation to confirm the diagnosis of ASD.

When he was admitted to the children's ward, he was found to be constantly blinking his eyes, covering his ears, flickering with fingers, fidgety and inattentive. He distracted other children and hid under the table. When talking, he occasionally mixed pronouns and had grammatical errors but was able to give good feedback. He had poor eye contact and minimal facial expression. During play, he didn't participate with the other children and was mouthing the toys and sensing them with his lips. He, however, enjoyed engaging in puzzles and was competent in them.

On the fourth day of admission, an IQ test (WISC-R) was carried out. However, the patient was uncooperative and the doctor advised that the test is to be repeated at a later appointment. The doctor conducted ADOS, and the score revealed that the patient hit the cut-off point for Autism. CARS was done and yielded a diagnosis of moderate Autistic disorder. As for the Adaptive Behaviour Scale (ABS), his performance indicated mild intellectual disability. The patient was discharged after the diagnosis was confirmed, and an appointment was booked to redo the IQ test, and to discuss the diagnosis with the parents. When the WISC-R test was repeated, the performance scale part was only administered. He obtained an IQ of 82 which placed him at the low average category.

Discussion:

Autism Spectrum Disorders (ASD) are a complex group of disorders that require a precise and comprehensive assessment in order to be diagnosed accurately. Similar to other psychiatric disorders, the diagnosis cannot be established through physical examination or lab finding. On the contrary, it requires a detailed history taking from the family and an adequate observation period from healthcare workers.

When the history was taken from the parents at the first appointment, they seemed to be very defensive and in a denial state. They had given different answers to the same question at times, and overall, they provided a poor history. Hence the low score that was first obtained from the M-CHAT. On the other hand, in later appointments, the parents began to accept the possible diagnosis of autism and were more cooperative. The doctor also had enough time to observe the child and base the answers of the M-CHAT on both her observation and the parents' report.

Usually, the parents present with concerns when the child is around 2 or 3 years of age. Their main concern would be lack or delayed speech. In this case, however, the patient developed some speech although very minimal and basic, and his non-verbal cognitive abilities were in the average range. The parents were obviously in denial, and refused to believe that their child had any problem. Therefore, it wasn't until the child went to school that he was referred to the department.

Limitations:

Many challenges hinder the diagnosis of ASDs, particularly, the individual characteristics that distinguish each child. For example, two patients may be diagnosed with moderate autistic disorder while each of them has a completely different set of features. Therefore, it is important to have a structured and objective tool to evaluate each patient individually. This means that to have an accurate diagnosis, the evaluation must be entirely focused on the patient, and must provide adequate time to assess his/her behaviour accurately.

There is a very long list of patients waiting to be evaluated for the diagnosis of ASDs in Bahrain. This is not only contributing to the anxiety experience by families, but is also resulting in a delay in accessing therapy and early intervention centers.

Unfortunately, the autism dilemma doesn't end when a diagnosis is obtained. The psychiatric hospital follows the Canadian guidelines for diagnosing ASD¹², and can provide excellent diagnostic services. Yet, there are a very few early intervention centers specialized in autism in this country. Many of which lack specialized therapists, and in which the child: teacher ratio greatly outnumbers the ratio of 1:1. This environment will negatively impact the progress of the child and his/her potentials. In addition, the minority of early intervention centers that provide evidence-based programs have very long waiting lists and cannot be afforded by the average Bahraini citizen.

Recommendations:

There's an urgent need to either expand the facilities of the Child and Adolescent Psychiatry department, or provide another institute with trained professionals capable of diagnosing ASD among the community (For example, through developmental behavioral pediatricians). After solving this issue, it will be reasonable to start training primary health care professionals in screening and detecting ASD in the population.

In addition, many of the early intervention centers in Bahrain face a difficulty in recruiting more staff and training them while maintaining a low tuition fee for the

families. The government must at least provide financial aid to the centers and take the responsibility of improving them. It must also train locals in the field of autism therapy to be competent and experts instead of recruiting specialists from abroad.

Community-wise, it is extremely important to educate future families about autism and how to detect it early. On the other hand, families with children with autism need to be further educated about the disorder, how to manage it and how to cope with it under the resources available here and abroad. Support groups for the families might be of great benefit. There are numerous misconceptions among the community, and these particularly need to be addressed while explaining the complexity and individuality of the disorder. Through educating the community, we must aim to tackle the stigma surrounding the disorder and help dissolve the denial many families suffer from.

Conclusion:

The delayed diagnosis of ASDs in children imposes negative impacts on the outcome. Many studies showed that early diagnosis, and consequently early intervention results in better outcomes for the patient.^{4,13} One research found that improvements in young children with ASDs were more rapid than other young children with other severe neurodevelopmental disorders.⁴ Therefore, it is critical to highlight this importance to provide better diagnostic and intervention facilities in the country. Finally, there's a need for further research about ASD in this region, especially about the epidemiology, diagnosis and effectiveness of the early intervention centers currently available.

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References:

1. Zwaigenbaum L. Autistic spectrum disorders in preschool children. Canadian family physician *Medecin de famille canadien*. 2001 Oct;47:2037-42.
2. CDC, USA. Facts, Autism Spectrum Disorders (ASD). [homepage on the internet]. March 29,2012 [cited 2013 February 22]. Available from: Centers for disease control and prevention: <http://www.cdc.gov/ncbddd/autism/facts.html#1>
3. Lord C, Risi S, DiLavore PS, Shulman C, Thurm A, Pickles A. Autism From 2 to 9 Years of Age. *Arch Gen Psychiatry*. 2006;63(6):694-701. doi:10.1001/archpsyc.63.6.694.
4. Nadel S, Poss JE. Early detection of autism spectrum disorders: screening between 12 and 24 months of age. *Journal of the American Academy of Nurse Practitioners*. 2007 Aug;19(8):408-17.
5. CDC, USA. Treatment, Autism Spectrum Disorders (ASD). [homepage on the internet]. March 29,2012 [cited 2013 February 22]. Available from: <http://www.cdc.gov/ncbddd/autism/treatment.html>
6. Grey,I; personal communication
7. Marhoon,H; personal communication
8. CDC, USA. Diagnostic criteria, Autism Spectrum Disorders (ASD). [homepage on the internet]. March 29,2012 [cited 2013 February 22]. Available from: Centers for disease control and prevention: <http://www.cdc.gov/ncbddd/autism/hcp-dsm.html>
9. Luyster R, Gotham K, Guthrie W, Coffing M, Petrak R, Pierce K, et al. The Autism Diagnostic Observation Schedule-toddler module: a new module of a standardized diagnostic measure for autism spectrum disorders. *Journal of autism and*

- developmental disorders. 2009 Sep;39(9):1305-20.
10. Schopler E, Reichler RJ, DeVellis RF, Daly K. Toward objective classification of childhood autism: Childhood Autism Rating Scale (CARS). *Journal of autism and developmental disorders*. 1980 Mar;10(1):91-103.
 11. Wechsler, D. (2004). *The Wechsler intelligence scale for children—fourth edition*. London: Pearson Assessment.
 12. Ali,N; personal communication.
 13. Dumont-Mathieu T, Fein D. Screening for autism in young children: The Modified Checklist for Autism in Toddlers (M-CHAT) and other measures. *Mental retardation and developmental disabilities research reviews*. 2005;11(3):253-62.

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Marfan Syndrome: A Case Study

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Abstract

Background: Marfan syndrome is an autosomal dominant, multisystem connective tissue disease, associated with a mutation in fibrillin, and occasionally a mutation in TGFBR 1 or 2. The cardinal manifestations of this condition involve the cardiovascular, ocular and skeletal systems.

Objective: To describe the features and complications of Marfan syndrome and discuss the current management.

Methods: Detailed history, physical examination and laboratory investigations.

Conclusion: This report underscores the importance of detailed family history and physical examination in the diagnosis of Marfan syndrome. Additionally, good insight about the pathogenesis and the clinical presentation of Marfan syndrome improves the effectiveness of medical therapies. Regular valvular monitoring and early initiation of beta blockers therapy as well as elective prophylactic surgical repair contribute to increasing the survival rate of Marfan patients.

Keywords: Marfan, Aortic dissection, Aortic aneurysm

Introduction:

Marfan syndrome is an autosomal dominant, multisystemic connective tissue disease, associated with a mutation in fibrillin, and occasionally a mutation in TGFBR1 or 2.^{1,2} The cardinal manifestations of this condition involve the cardiovascular, ocular and skeletal systems.³ The prevalence of Marfan syndrome is approximately 1 per 5000 population⁴ and 26% of the cases have no family history.^{5,6} Cardiovascular pathology, including aortic root dilatation, and aortic dissection, is the leading cause of death in MFS patients.⁴ Characteristic clinical features include anterior chest deformities, long fingers, aortic root dilatation and dissection, lens dislocation and myopia. Further less specific features include high arched palate, crowding of the teeth and skin striae.⁵ Medical management may not reverse the features seen, but can reduce the progression and the severity of the symptoms. Beta blockers are considered as the standard therapy, as they work by reducing the aortic shear stress and the heart rate. Diagnosis is mainly done using the

Ghent criteria and a detailed clinical examination. Although early diagnosis and refined medical and surgical management have increased median life expectancy from 40 to approximately 70 years,⁴ individuals with Marfan syndrome continue to suffer important morbidity.

Case report:

The patient, a 26-year-old Bahraini young man, was first seen in BDF on May 8th after being referred from SMC for consideration of prosthetic aortic valve implantation. As far as could be ascertained, his development, except that he was taller than the rest of his family members and friends, has been entirely normal, until the age of 18, when he was first diagnosed to have Marfan syndrome. No family history of such disease was present; everyone else seems to be fine according to the patient with no significant medical conditions, except for the mother, who suffers from G6PD. Since the age of 6, the patient suffered from severe myopia and underwent surgical correction accordingly. In 1995, surgical lens

removal for the management of congenital myopia and IOL implant were done on the patients left eye at King Khalid's Hospital, KSA. Another surgery (Scleral buckle surgery) was done on the same eye in 2011 for the management of retinal detachment. The patient also underwent a similar surgery at the age of 6 for his right eye, but the surgery wasn't successful, and as a result the patient suffered from right-eye blindness afterwards. On April 27th, during his trip to Saudi, the patient noted a mild productive but gradually progressive cough, with a high grade fever (around 40 degrees), a mild shortness of breath, fatigue and night sweats. The patient complained of severe dyspnea and chest pain when lying flat on his back or laterally on his left side. However, no headache, syncope, nausea or vomiting was noted. The patient went for checkups the following day, and was prescribed antibiotics. Fever was still high, and not responsive to the antibiotics, therefore the patient paid another visit to the doctor, and proper investigations showed a severe chest infection. The patient was given pain relief medications, cough medications and antibiotics and then he returned back to Bahrain on May 4th, where he was admitted in SMC for his chest infection. On routine evaluation he was found to have a dilated mediastinum, and on further evaluation, he was found to have an aortic dissection. Hence he was referred to BDF for further investigations. The patient is unmarried, unemployed, and lives with his parents. He is a never smoker and a never drinker, with no known allergies.

Physical examination revealed him to be a tall, thin white man with extremely long fingers, who appeared much older than his stated age. Blood pressure was 160/100 mmHg, the pulse was 110 beats per minute, with a regular rhythm and a collapsing character. The patient had a temperature of 37.8 and was slightly tachypneic with a respiratory rate of 22 breaths per minute. Closer examination of the hands showed stage 3 clubbing (increased curvature of the nail bed), some arthritic changes such as the Z-thumb deformity. Characteristic Marfan bony changes were also present, in which wrist and thumb signs were noted as well as a mild pectus excavatum. The patient suffered from a high arched palate but no dental abnormalities were present. Upon assessment of the precordium, a hyperdynamic displaced apex beat was felt in the 6th intercostal space, midclavicular line. A

grade 4 early diastolic murmur was heard over the tricuspid and aortic areas, but it was with a greater intensity over the tricuspid region. S1 and S2 were both audible, however S2 was louder. On percussion and auscultation of the back, right basal crackles were heard with dullness over the right lower lobe of the lung. Examination of the abdomen showed visible pulsation above the umbilicus, and stretch marks. There was no venous distension, organomegaly, cyanosis, or ascites. Peripheral pulses were felt, and no edema was detected in the lower limbs. On systematic review, no abnormalities were found other than the patient's presenting symptoms, with episodic headaches and dizziness, and some mild joint pain at the knees. Regular tests were first carried out, such as CBC, U&E, and LFTs (Table 1).

Xrays were done and showed a right basal consolidation with cardiomegaly (Figure 1). CT was also done and showed a very large aneurysm affecting the ascending thoracic aorta starting at the level of the aortic valve and terminating just proximal to the arch, measuring approximately 9x7cm in maximum dimension. The dissection was shown to be starting very low at the level of the valve and involving the entire aneurysmal aorta, preserving the arch. There was no involvement of the arch or the major vessels arising from the arch. The remainder of the thoracic aorta including the arch, the descending thoracic aorta and also the abdominal aorta were all normal in caliber with no evidence of dissection. The iliac arteries were within normal limits. There was a consolidation noted affecting the right lower lobe and also some pleural fluid was noted in the right side. Some fluid was also detected in the right hilum which was felt to be reactive. No CT evidence of aortic rupture was shown. A gross cardiomegaly was also visible (Figure 2).

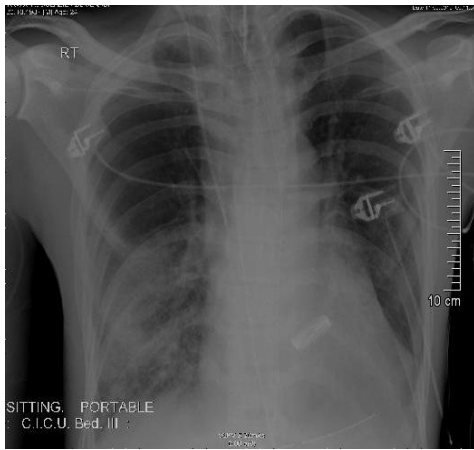
Echo was done twice, one before the surgery and one after, to allow for comparison and to assess the patient's improvement. The pre-op echo showed a severe aortic regurgitation, a mild mitral prolapse with a minor mitral regurgitation and a trivial pulmonary regurgitation. A severe dilatation of the aorta (6.8 cm) and sinus of valsalva (6.6 cm) with a type (A) dissection flap of the ascending aorta were seen. The post-op (Bentall procedure) echo showed a significant difference. Prosthetic valve was well seated with normal motion, and no

Test				
WBC	12.6	X10 ⁹ /L	-	
RBC	3.74	10 ¹² /L	4-5.5	Low
HGB	103	g/L	130-180	Low
HCT	0.316	L/L	0.4-0.5	Low
MCV	84.4	Fl	80-100	Normal
MCH	27.7	Pg	27-32	Normal
MCHC	327	g/L	310-360	Normal
PLT	490	X10 ⁹ /L	150-450	High
Potassium	4.2	Mmol/L	3.5-5.1	Normal
Urea	3.8	Mmol/L	2.9-8.3	Normal
Creatine	49.1	Umol/L	59-104	Low
Magnesium	1.01	Mmol/L	0.7-1.05	Normal
eGFR	60	ml/min/1.7m	60	Normal
AST	46.9	IU/L	0-37	High
LDH	300	IU/L	135-225	High
CK	319	IU/L	24-170	High
CK-MB	23.3	IU/L	0-24	Normal

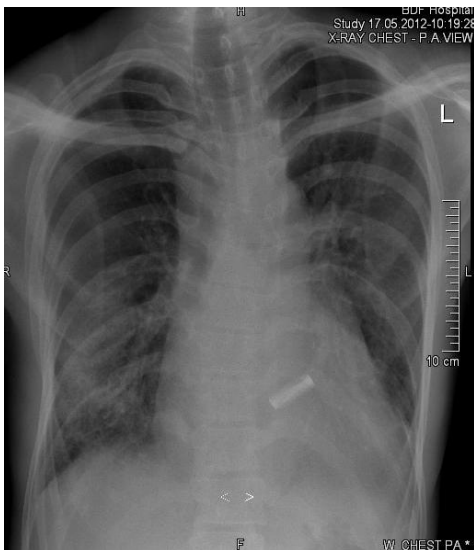
Figure 1. Xray



Chest x-ray done on the 9th showing a mediastinal widening with right basal to mid zone consolidation



Chest x-ray done on the 11th showing a partial resolution of consolidation.



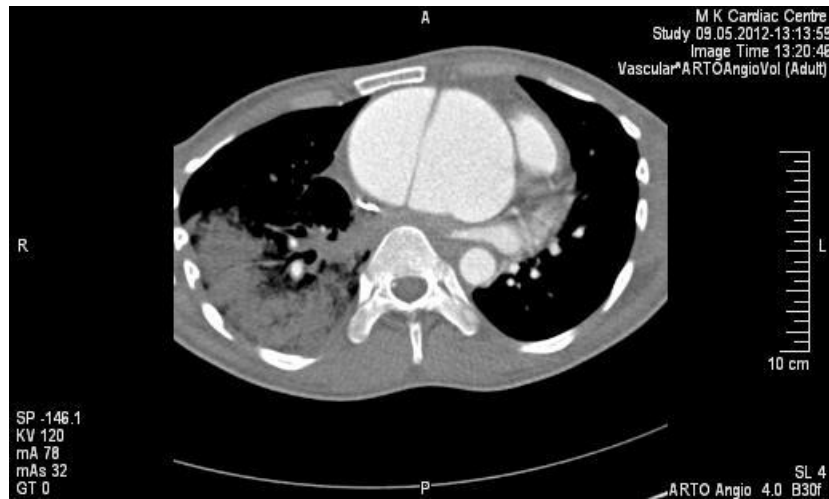
Chest x-ray done on the 17th showing a gradual resolution of consolidation

significant aortic incompetence or mitral incompetence (Figure 3).

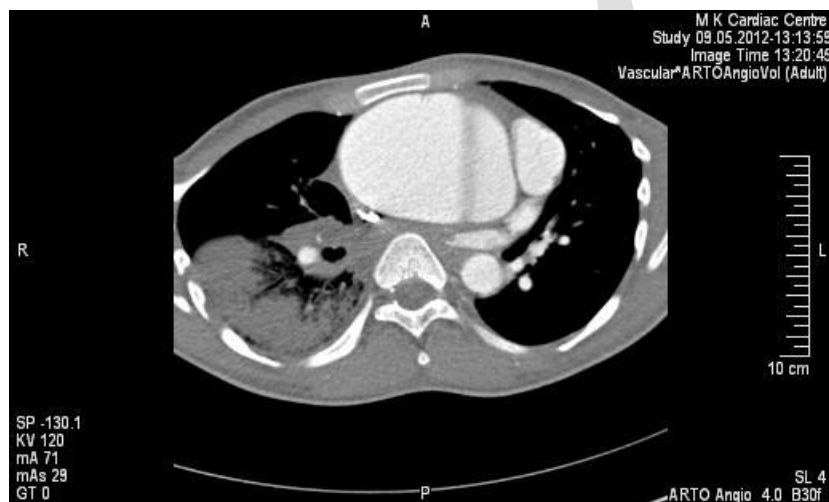
After initially controlling the patient's chest infection, the patient underwent Bentall surgery on May 10th for dissection of ascending aorta, a severe aortic regurgitation, and an aortic aneurysm of around 8 cm. The surgery was performed through median sternotomy and vertical pericardiotomy. After cardioplegia, aortotomy was done with resection of the aneurysm and the AV. Coronary arteries were dissected with 10.0mm buttons. Replacement

of valve was done using 29 carbosel valsalva bileaflet composite graft. This is the worldwide used procedure for such indications (Figure 4).

During the post-op phase, 10 packs of cryoprecipitate, and 2.4 mg IV of factor 7 were given to maintain the patient hemodynamically. The patient was also given morphine and IV panadol to relieve the pain. A mild productive but gradually improving cough with white sputum was present. The patient was managed with medication throughout his hospital stay (Table 2). Warfarin dosage was given depending on the INR (Table 3).

Figure 2. CT

Aortic flap with a consolidation in the right lung



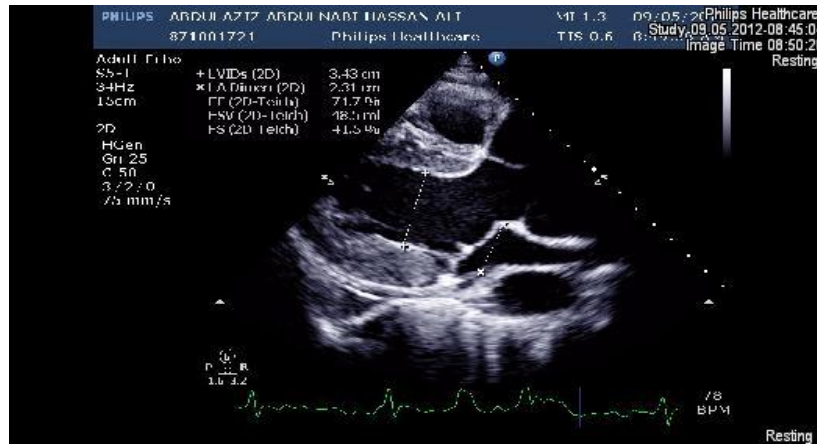
Aortic flap/dissection.

Discussion:

Pathophysiology and Etiology: Fibrillin is an important component of the microfibrillar system that acts as a scaffold for elastogenesis. Classical Marfan syndrome is associated with a mutation in FBN1, the gene that encodes for fibrillin-1. The pathophysiological outcomes of the degeneration of elastic fibers in Marfan syndrome seem to explain the majority of manifestations of this condition. Stiffness and reduced distensibility of the aorta in response to increased pulse pressure, is the main most important

consequence of elastin degeneration.⁵ Recently, another hypothesis has emerged trying to explain the pathophysiology behind Marfan syndrome. Transforming growth factor β (TGF β), a cytokine that regulates cell morphogenesis, is thought to contribute to the Marfan syndrome phenotype. Abnormal fibrillin causes failure of the sequestration of the inactive latent precursor of TGF β , resulting in excessive TGF β activation, and thus producing the phenotypical manifestations of Marfan's.⁴

Figure 3. Echocardiogram



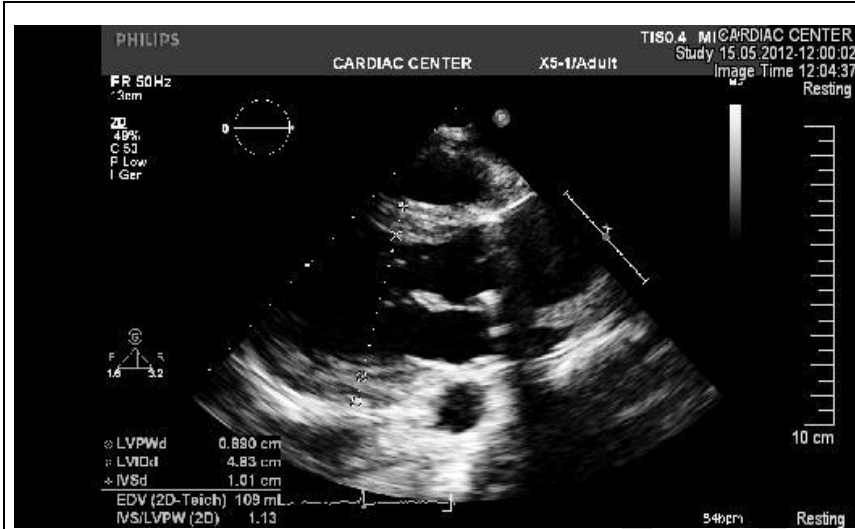
Aneurysmal aorta in diastole



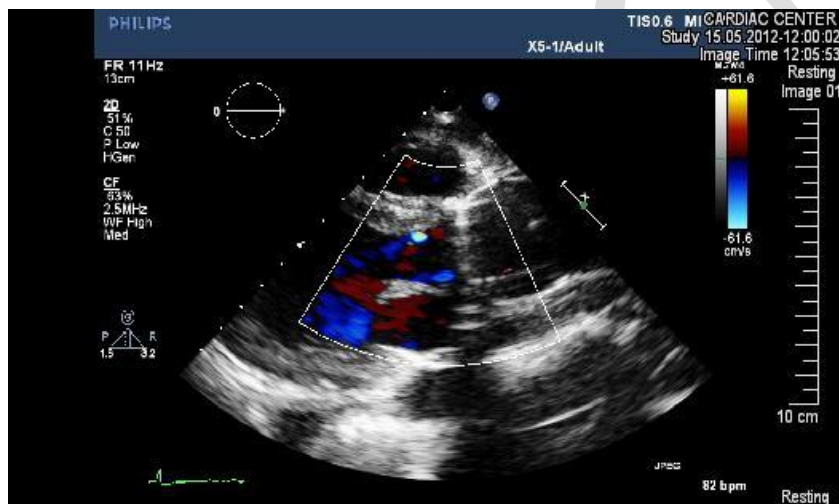
Aneurysmal aorta in systole



AR Doppler study showing AR jet



Prosthetic valve in
LV outflow



Doppler study done on the 19th
showing absence of AR

Figure 4. Bentall Procedure

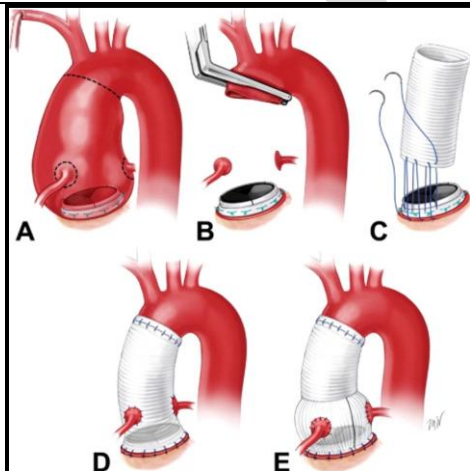
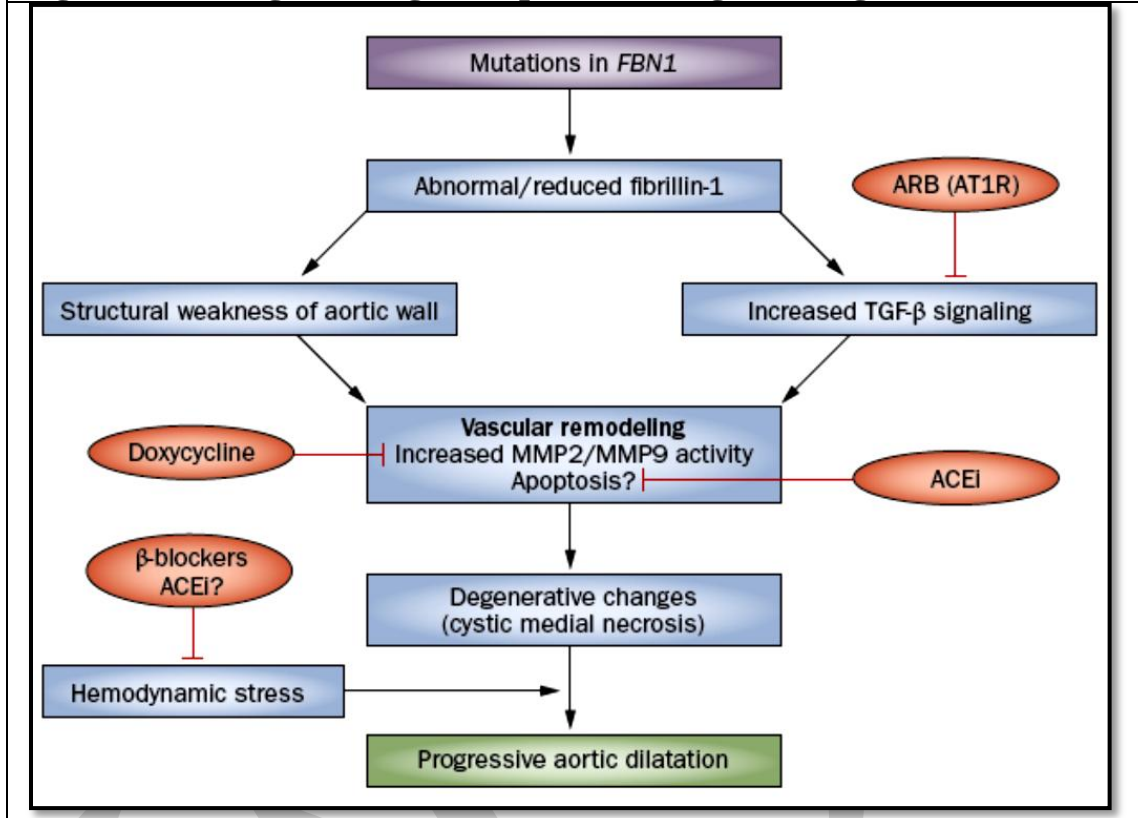


Table 2. Medications

Medication	Generic name	Dose	Route	Date started	Date stopped
MgSO4	MgSO4	1.5 g BD	IV	11 th /5	13 th /5
Rocephen	Ceftriaxone	2g OD	IV	11 th /5	13 th /5
Clarithromycin	Clarithromycin	500 mg BD	PO	8 th /5	13 th /5
Aspirin	Acetylsalicylic acid	75mg OD	PO	11 th /5	12 th /5
Warfarin	Warfarin	OD (dose depends on INR)	PO	11 th /5	15 th /5
Nexium	Esomeprazole	40mg OD	PO	11 th /5	13 th /5
Panadol	Paracetamol	1g TDS	PO	11 th /5	13 th /5
Combigan	Brimonidine/timolol	1 drop, left eye, BD	Ophthalmic solution	11 th /5	15 th /5
Combivent	Ipratropium bromide and albuterol sulfate	2ml TDS	Inhalation	11 th /5	15 th /5
Lasix	Furosemide	40mg OD	PO	11 th /5	13 th /5
Metoprolol	Metoprolol	12 th /5 → 12.5mg BD 13 th /5 → 25mg BD 14 th /5 → 50mg BD	PO	12 th /5	14 th /5
Lexotanil	Bromazepam	1.5mg TDS	PO	11 th /5	14 th /5
Morphine	Morphine	2mg OD	IV	11 th /5	13 th /5
Maxalon	Metoclopramide	10mg TDS	IV	11 th /5	11 th /5

Table 3. INR

Date	Time	INR	Dose
11 th /5	6:00	0.97	5mg
12 th /5	6:00	1.4	5mg
13 th /5	6:00	1.9	4mg
14 th /5	6:00	3.1	HOLD
15 th /5	6:00	2.6	2mg

Figure 5. Pathogenic targets of pharmacological drugs.⁸

Clinical Presentation:

Marfan syndrome primarily involves the skeletal, ocular and cardiovascular systems. Typically patients with Marfan syndrome present with tall stature, ectopia lentis, aortic root dilatation, and positive family history. Our patient presented with all the mentioned symptoms except for the family history.

Differential diagnosis:

Clinical diagnosis of Marfan syndrome is challenging because of the increased marfanoid features of other connective tissue diseases. Differential diagnosis could include homocystinuria, familial aortic dissection, familial arachnodactyly, Ehler Danlos syndrome and MEN IIb. Serum methionine must be carried out to rule out

homocystinuria.³ Molecular techniques have not been undertaken widely as a method to distinguish between Marfan syndrome and other similar-featured disorders, as it is not clear whether they can differentiate between those conditions with overlapping symptoms.⁵

Management:

Although clinical management of genetic disorders is not backed up by extensive clinical trials on humans, numerous studies conducted in vivo managed to establish a direct link between the administration of angiotensin receptor blockers (ARBs) and the inhibition of TFGβ signaling.⁴ Various retrospective studies have assessed the beneficial effects of beta blockers (BB) therapy in Marfan syndrome, and considered it to be the standard of care. The potential benefit of beta blockers is

attributed to the reduction of aortic wall stress and heart rate.⁸ All Marfan syndrome patients who can tolerate beta blockers should be treated regardless of the presence or absence of aortic dilatation. No randomized trials reported solid evidence on the use of angiotensin converting enzyme inhibitors (ACEI), however this class of drugs has the theoretical advantage of reducing the ejection impulse and vascular smooth muscle apoptosis which is implicated in cystic medial degeneration.⁵ Recent trials have been aiming to manufacture drugs that are directed at the fibrillin-1 or TGF β axis to produce the maximum desirable effect.⁹ The various pharmacological therapies and their actions in Marfan syndrome are shown in figure 5.

Many comparative studies have shown that there is a better outcome with early aortic root surgery than with an emergency or later surgery. Prophylactic surgery is recommended when the diameter at the sinus of Valsalva exceeds 5.5 cm in adults.

Conclusion:

Marfan syndrome is the most common inherited connective tissue disorder with diverse clinical manifestations. Although many studies have been conducted which aimed at improving the medical aspect of management, those trials produced conflicting results and generally involved relatively few patients.

This report underscores the importance of detailed family history and physical examination in the diagnosis of Marfan syndrome. Additionally, good insight about the pathogenesis and the clinical presentation of Marfan syndrome improve the effectiveness of medical therapies. Regular valvular monitoring and early initiation of beta blockers therapy as well as elective prophylactic surgical repair contribute to increasing the survival rate of Marfan patients.

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References:

1. John C S Dean. Marfan syndrome: clinical diagnosis and management. *Eur J Med Genet.* 2007 May; 15:724–733
2. Krause KJ. Marfan syndrome: literature review of mortality studies. *J Insur Med.* 2000; 32(2):79-88.
3. Rangasetty UC, Karnath BM. Clinical signs of Marfan syndrome. *Hosp physician* 2006 April; 42(4):33-38.
4. Lacro RV, Dietz HC, Wruck LM, Bradley TJ, et al. Rationale and Design of a Randomized Clinical Trial of Beta Blocker Therapy (Atenolol) vs. Angiotensin II Receptor Blocker Therapy (Losartan) in Individuals with Marfan Syndrome. *Am Heart J.* 2007 October; 154(4):624–631.
5. Dean JC. Management of Marfan syndrome. *Heart* 2002; 88(1):97–103.
6. Collod-Bérout G, Boileau C. Marfan syndrome in the third Millennium. *Eur J Hum Genet.* 2002 November; 10(11):673–681.
7. Ekure EN, Onakoya AO, Oke DA. Marfan syndrome: a study of a Nigerian family and review of current cardiovascular management. *West Afr J Med.* 2009 Jan; 28(1):48-53.
8. Cañadas V, Vilacosta I, Bruna I, Fuster V. Marfan syndrome. Part 2: treatment and management of patients. *Nat Rev Cardiol.* 2010 May; 7(5):266-76.
9. Keane MK, Pyeritz RE. Medical Management of Marfan syndrome. *Circulation.* 2008; 117:2802-13.

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