



Interdisciplinary Orthodontics: A Review

Dr. Monika Kanoj¹, Dr. Ashok Khandelwal², Dr. Shweta Raghav³

¹PG Student, Department of Orthodontics & Dentofacial Orthopedics, College Of Dental Science & Hospital Rau, Indore.

²Professor & HOD, Department of Orthodontics & Dentofacial Orthopedics, College Of Dental Science & Hospital Rau, Indore.

³Reader, Department of Orthodontics & Dentofacial Orthopedics, College Of Dental Science & Hospital Rau, Indore.

(Corresponding Author: Dr. Shweta Raghav, Reader,

Date of Submission: 30-07-2020

Date of Acceptance: 07-08-2020

ABSTRACT: In this present era, when a significant number of patients seeking orthodontic treatment are adults, importance of multidisciplinary treatment approach cannot be overemphasized. The interdisciplinary approach required involvement and active communication of various specialists like Prosthodontist, Periodontist, Endodontist and Oral Surgeon with orthodontist throughout treatment, from the diagnosis and treatment planning stage through to the completion of active treatment and into retention phase, thereby greatly improving quality of care and treatment prognosis. The concept of IDT was developed to maximize treatment results by optimally synergizing the knowledge, skill, and experience of all the disciplines in dentistry and its associated fields, while minimizing the frustrating and problematic shortcomings of unidisciplinary therapy. In today's esthetic environment the orthodontic specialty focuses on interdisciplinary treatment planning. Therefore, contemporary clinicians attempts to achieve realistic treatment goals that aim to many the objectives of both clinician and patient. So the purpose of this article is to briefly describes an interdisciplinary approach for the management of complex dentofacial problems produces consistent optimal results.

KEYWORDS: Interdisciplinary orthodontics, Prosthodontist, Endodontist, Periodontist, Oral surgeon.

I. INTRODUCTION

In the past three decades, a major reorientation of orthodontic thinking has occurred regarding adult patients amongst orthodontists and adult patients. Today, more adult patients than even before are receiving orthodontic treatment, with more sophisticated treatment goals and expectations. Many orthodontists practicing today have 45% of adult patients¹. This is probably because of an

increased awareness of malocclusion and functional benefit of orthodontic treatment. In addition, with the availability of a variety of cosmetic appliances, improved appliance placement techniques, there is an increased interest by orthodontists in adults as patients, as well as by adults in orthodontic treatment².

Interdisciplinary therapy: The ultimate utilization of the expertise and skills in the various dental disciplines is called interdisciplinary dentofacial therapy (IDT). This interdisciplinary approach required involvement and active communication of various specialists like Prosthodontist, Periodontist, Endodontist and Oral Surgeon with orthodontist throughout treatment, from the diagnosis and treatment planning stage through to the completion of active treatment and into retention phase, thereby greatly improving quality of care and treatment prognosis. Therefore, contemporary clinicians attempts to achieve realistic treatment goals that aim to many the objectives of both clinician and patient.

This new concept of interdisciplinary collaboration between orthodontics and other specialties of dental medicine is best synthesized by the word TEAM. (TOGETHER EVERYONE ACHIEVES MORE) (Figure 1)



Figure 1: Interdisciplinary Orthodontics: TEAM



II. ORTHO-ENDO INTERRELATIONSHIP

Endodontist have a major role to play in the interdisciplinary treatment with the combination of Orthodontist, the teeth movement largely changes the periapical environment of the teeth and there may be many chances of the tooth to lose its vitality or resorb due to orthodontic force magnitude and also clear idea need to be there to treat the endodontically treated teeth and traumatized teeth during the orthodontic treatment. During rapid tooth movement pulpal injury may occur. This is primarily due to an alteration in the blood vessels in the apical periodontium and those entering the pulp³.

Segal et al⁴ stressed that the need for prolonged treatment involving significant degrees of dental movement is a strong risk factor for severe resorption. Thus, the long duration of treatment, the retraction mechanics employed, and prolonged use of intermaxillary elastic bands may have contributed significantly to the severe root resorption in this patient. Endodontically treated teeth can be moved as readily and for the same distances as teeth with vital pulps since tooth movement is the response of the periodontal ligament, not the pulp⁵.

III. ORTHO-PROSTHO INTERRELATIONSHIP

Often orthodontists can be of considerable assistance in prosthodontic treatment. Dental alignment of the arches can facilitate prosthodontic objectives, a strategy referred to as “facilitative orthodontics.” Occasionally, orthodontists and general dentists encounter a patient who has traumatically avulsed a maxillary central incisor or a patient with a geminated or fused maxillary central incisor that must be removed.

Treatment alternatives for patients with two upper incisors missing⁶.

1. Maintenance or recovery of the missing incisor space, followed by prosthetic reconstruction.
2. Space closure and establishment of Class II posterior relationships.
3. Space closure and extraction of two teeth, usually premolars or lateral incisors, in the lower arch and establishment of Class I posterior relationships.

Treatment option for congenitally missing lateral incisor include, Canine substitution, a tooth-supported restoration, and a single-tooth implant⁷. The better choice for treating a peg-shaped lateral incisor (Figure 2) is to restore the malformed tooth to its correct dimension. Compressed coil springs

are placed between the central incisor, lateral incisor and canine to generated space. The gingival margins of the peg-shaped lateral should be aligned with the contralateral lateral incisor. The restorative dentist will restore proper length, width, and thickness of the tooth when the temporary composite build-up and final restoration are constructed.



Figure 2: Peg shaped lateral incisor

When a posterior tooth (usually first permanent molars) is lost the adjacent teeth usually drift and rotate and gingival tissue becomes folded and distorted, Forms pseudopocket that is impossible to clean. The elimination of potentially pathologic conditions associated with tipped molars is probably the most important procedure and has the added advantage of simplifying the ultimate restorative procedures⁸.

IV. ORTHO-PERIO RELATIONSHIP

The main objective of periodontal therapy is to restore and maintain the health and integrity of the attachment apparatus of teeth. The interrelationship between orthodontics and periodontics often resembles symbiosis. In many cases, periodontal health is improved by orthodontic tooth movement, whereas orthodontic tooth movement is often facilitated by periodontal therapy.

Periodontal conditions which requires orthodontic treatment includes; midline diastema and correction of black triangles: Adult patients previously affected by periodontal disease often present with “black triangles” due to missed interdental papillae height. By means of orthodontics, it is possible to correct teeth position and to improve soft tissue aesthetics. Pathological migration with infrabony defects are corrected by various orthodontic tooth movements such as intrusion, extrusion, rotation, and uprighting are needed to achieve an esthetically acceptable outcome.

Localized, aggressive periodontitis was formerly called localized juvenile periodontitis or localized early-onset periodontitis. This disease



causes localized breakdown of the periodontal attachment in particular parts of the dental arch early in life⁹. The common symptom is rapid attachment loss in the first molar and incisor area.

Case report on orthodontic treatment in aggressive periodontitis¹⁰:

A patient aged 27 years 4 months with a chief complaint of rapid extrusion of the maxillary incisors due to localized aggressive periodontitis. Radiographically, bone loss extended to the root apex of the right maxillary central incisor, and vertical bone defects were found on both maxillary first molars and the left lateral incisor. A furcation defect was present on the left maxillary first molar.

The patient had maxillary dentoalveolar protrusion, a Class II molar relationship, 2 mm of overbite, and 6 mm of overjet. The prognosis for the right maxillary central incisor was hopeless, so it was extracted and replaced with a Maryland bridge pontic. The mandibular anterior teeth were severely crowded. After central incisor was extracted, and guided bone regeneration performed (Figure 3).



Figure 3: A. Extraction of maxillary right central incisor. B. Guided bone regeneration.

Open-flap curettage was completed by age 27 years 11 months. The mandibular left central incisor was extracted at age 28 years 3 months.

After periodontal re-evaluation to ensure that most of the pockets were less than 3mm a preadjusted edgewise appliance with an .018-in slot was placed at age 28 years 5 months. The leveling process started with a .012-in nickel-titanium archwire after cervical pull-type headgear was applied to the maxillary first molars. Mandibular central incisor crowding was relieved, and the mesial inclination of the mandibular molar was improved after 11 months of leveling. A .017 x .025-in stainless steel archwire was placed in the mandibular arch, and a .016 x .022-in multiloop edgewise archwire was placed in the maxillary arch. Class II elastics were used to encourage distal movement of the maxillary dentition (Figure 4).



Figure 4: Uprighting of maxillary dentition

After 7 months of uprighting and 3 months of detailing, the orthodontic appliances were removed. The overall active orthodontic treatment duration was 21 months.

V. ORTHO-ORAL SURGERY INTERRELATIONSHIP

The interdisciplinary relation between the orthodontics and oral surgery is an important part of the orthodontic treatment planning and a deciding factor for considering a case to treat either with the simple camouflage or to treat with the surgical intervention.

The main issues, concerning the impacted third molars that are related to orthodontic treatment and have been most extensively reported throughout the literature are: the possibility of their eruption or impaction in relation to genetically predetermined factors, the possible repercussion of orthodontic treatment extractions in their position and their influence in orthodontic post-treatment mandibular incisor relapse¹¹. If the degree of impaction is increased by orthodontic treatment then removal of the teeth can be accomplished when facial development and the corrected occlusion have been completed.

Palatal displacement of the maxillary canines is defined as the developmental dislocation to a palatal site often resulting in tooth impaction requiring surgical and orthodontic treatments¹². Radiographic evaluation includes panoramic view (OPG), lateral cephalogram, IOPA x-rays with parallax technique (horizontal/vertical) and occlusal view (Figure 5). Specialized views include CT and CBCT.



Figure 5: Impacted canine occlusal radiograph view and CBCT view.

Management of palatally impacted canine :

There are numerous surgical methods for exposing the impacted canine and bringing it to the line of occlusion. The most commonly used methods are:

1. Surgical exposure, allowing natural eruption to occur
2. Surgical exposure with the placement of an auxiliary



The surgeon can also aid the orthodontist by providing other services such as: treatment of cleft lip & palate, maxillary and mandibular deformities, in procedures like distraction osteogenesis.

VI. ORTHO-PEDO INTERRELATIONSHIP

Oral trauma in children and adolescents remains a significant health issue that can benefit from an interdisciplinary approach between the orthodontist and the pediatric dentist.

Children and adolescents who experience oral trauma can particularly benefit from a team of dental specialists who are coordinating care, maintaining constant communication, and sharing decision-making in order to maximize available treatment options and attain an optimal health result¹³.

The pediatric or adolescent patient with a history of dental trauma adds a level of complexity to the orthodontist's plan of treatment already challenged with traditional issues of home care, caries risk status, and patient willingness or ability to comply. All of these considerations necessitate the need for coordinated patient care between pediatric and orthodontic specialties in order to achieve safer and more effective care.

Case report¹⁴:

A 12-year-old boy with extrusion of the maxillary right central incisor, uncomplicated fracture of the left central incisor, avulsion of the mandibular right and left central incisors, and crown fracture of the mandibular right lateral incisor presented to the Kocaeli University Department of Pediatric Dentistry 20 days after sustaining the traumatic injuries. Orthodontic repositioning of the extrusive maxillary right central incisor was planned. Additionally, this tooth was necrotic and needed root canal treatment. The maxillary left central incisor and right mandibular lateral incisor were necrotic and needed root canal treatment. The orthodontic and endodontic treatments were successfully performed simultaneously. Restoration of the fractured mandibular right lateral incisor and maxillary left central incisor was completed with resin composite. Subsequent to orthodontic and endodontic treatment, prosthodontic rehabilitation was performed. At the two-year follow up, the teeth appeared normal and the patient had no complaints.



Figure 6 : Intraoral pictures before, during and after treatment.

VII. ORTHODONTICS AND MISCELLANEOUS

A. Orthodontics & Pediatrics

Pediatricians have frequent contact with families during routine preventive visits in the childhood years of life and are in a position to advise families about the prevention of oral diseases in their children and to refer them to an adequate professional. It is important to educate pediatricians with knowledge of craniofacial growth, which may enhance the implementation and eventual success of preventive measures. Also, there are some recognized problems and habits that should be identified early and discouraged, to allow for optimal craniofacial growth and development, and some that require early referral to the orthodontist.

B. Orthodontist and Endocrinologist

The endocrine system is an intricate network that is regulated metabolic processes throughout the body, controlling the growth and differentiation of various parts of the skeleton. Hence, disruption of any part of this system may lead to widespread alterations of the human physiology, resulting in metabolic, anatomical, and/or growth-related disturbances. Although a disturbance in virtually any part of the endocrine system would be expected to have orthodontic implications; disorders of the pituitary, thyroid, parathyroid, and pancreas are of particular interest to the orthodontist.

C. Orthodontist and Psychiatrist

A majority of patients attending an orthodontic clinic are children and young adults at with rapid and drastic changes at various stages of maturation, taking place, both in their minds and bodies. The psychiatric disorders most commonly encountered by the orthodontist are either major depressive disorder (MDD) or attention deficit hyperactivity disorder (ADHD)¹⁵.

VIII. CONCLUSION

The interdisciplinary team creates a network of shared skills and expertise, open communication, and trust. The ultimate goal is to create and perpetuate an ideal treatment environment in which the patient feels comfortable and doctors can work effectively the ability to



change. Within the period of dentistry, the use of interdisciplinary approach has been found to be of remarkably important in achieving treatment success for individuals with adverse and unfit oral health conditions & medical or behavioral challenges 'Constant interaction' & communication among the members & the patients at all level of treatment are the keys to the success of the interdisciplinary treatment.

REFERENCES

- [1]. Karad A. Clinical orthodontist current concepts, goals and mechanics. Elsevier publication 2010.
- [2]. Goldsteis MC. Adult orthodontist. Am J OrthodDentofacialOrthop 1953;39 (6):400-24. 3)
- [3]. Seltzer S and Bender IB. The dental pulp. Philadelphia J B Lippincott Company;1984:3rdedn.
- [4]. Segal GR, Schiffman PH, Tuncay OC. Meta analysis of the treatment-related factors of external apical root resorption. OrthodCraniofac Res 2004;7:71-8.
- [5]. Mirabella AD, Artun J. Prevalence and severity of apical root resorption of maxillary anterior teeth in adult orthodontic patients. Eur J Orthod 1995;17:93-9.
- [6]. Schwaninger B, Shaye R. Management of cases with upper incisors missing. Am J OrthodDentofacialOrthop 1977;71(4):396-405.
- [7]. Kokich VO, Kinzer GA. Managing congenitally missing lateral incisors, Part 1: Canine Substitution. J EsthetRestor Dent 2005;17:16.
- [8]. E Capelluto and I Lauweryns. A Simple Technique for Molar Uprighting. J ClinOrthod 1997;31(2):119-25.
- [9]. Reed BE, Polson AM, Subtelny JD. Long-term periodontal status of teeth moved into extraction sites. Am J Orthod 1985;88:203-8.
- [10]. Sachiko et al. Interdisciplinary treatment of a patient with severe pathologic tooth migration caused by localized aggressive periodontitis. Am J OrthodDentofacialOrthop 2005;127:374-84.
- [11]. Elsey MJ, Rock WP. Influence of orthodontic treatment on development of third molars. Br J Oral MaxillofacSurg 2000;38:35053.
- [12]. Grace Richardson, Kathy A. Russell. A review of impacted permanent maxillary canine: Diagnosis and prevention. J Can Dent Assoc 2000;66:497-501.
- [13]. Elbay et al. Multidisciplinary Approach to Delayed Treatment of Traumatic Teeth Injuries Involving Extrusive Luxation, Avulsion and Crown Fracture. Clinical Technique/Case Report. Operative Dentistry, 2014, 39-6, 566-571
- [14]. Neeley WW, Kleumper GT, Hays LR. Psychiatry in orthodontics. Part I. Typical adolescent psychiatric disorders and their relevance to orthodontic practice. AmJOrthodDentofacOrthop 2006; 129: 176-84.