Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 07, pp.71800-71803, July, 2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

REVIEW ARTICLE

PARADIGM SHIFT IN ORTHODONTICS- REVIEW

[1,*]Dr. Puneet Sharma, [2]Dr. Devinder Preet Singh, [3]Dr. Pradeep Yadav and [4]Dr. Ramniwas Kumawat

[1]PG resident, Dept of Orthodontics and dentofacial orthopedics, Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh
[2]Associate professor, Dept of Orthodontics and dentofacial orthopedics, Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh
[3]PG Resident, Dept of Oral and Maxillofacial Surgery, Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh
[4]Assistant Professor, Dept. of Dentistry, Govt. Medical College, Pali, Rajasthan

ARTICLE INFO

Article History:
Received 29th April, 2018
Received in revised form
07th May, 2018
Accepted 25th June, 2018
Published online 31st July, 2018

Key Words:
Soft tissue paradigm,
Temporary anchorage devices,
Surgery first approach.

ABSTRACT

New paradigms are continuously developing in orthodontics. Paradigm shift is a fundamental change in the basic concepts and experimental practices of a scientific discipline. New idea generally experience great resistance from practitioners in the field and once the idea is accepted by various practitioners, a new paradigm begins. When this natural dentition state occurs, the face should also be in the perfect harmony and balance and the stomato-gnathic system should function ideally. All these appliances and various other modifications serve the purpose of anchorage but with some limitations like patient compliance especially with extra oral appliances and anchorage loss to some extent.

Copyright © 2018, Puneet Sharma et al. *This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.*

Citation: ***Dr. Puneet Sharma, Dr. Devinder Preet Singh, Dr. Pradeep Yadav and Dr. Ramniwas Kumawat*, 2018.** "Paradigm shift in orthodontics- Review", *International Journal of Current Research*, 10, (07), 71800-71803.

INTRODUCTION

A paradigm shift concept was identified by the American physicist and philosopher Thomas Kuhn (1922–1996).He explained paradigm shift as a fundamental change in the basic concepts and experimental practices of a scientific discipline. According to Ackerman and Proffit (Ackerman *et al*., 1999). "A universally accepted scientific perspective, the best current explanation of natural phenomenon, has been termed as a paradigm." Once the paradigm shift in concept or ideas occurs today's truth becomes tomorrow's myth. Any new idea generally experience great resistance from practitioners in the field and once the idea is accepted by various practitioners, a new paradigm begins. A new paradigm leads to explosion of new ideas and knowledge that leads to various advances in field. Similarly orthodontics has evolved rapidly in the past.

***Corresponding author: Dr. Puneet Sharma,**
PG resident, Dept of Orthodontics and dentofacial orthopedics, Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, Chandigarh.
DOI: https://doi.org/10.24941/ijcr.29513.07.2018

Several changes in various aspects have been seen in treatment planning, mechanics, and assessment of orthodontic treatment leading to new paradigms. Major paradigms seen in orthodontics from time of Dr. EH Angle till today are

- Soft tissue paradigm
- Temporary anchorage devices
- Surgery first approach

Soft tissue paradigm: The orthodontic treatment is based on esthetics. The patients generally recognize the improvement in facial and smile appearance rather than underlying hard tissue changes. The current popularity of the "selfie" illustrates this point. So the current trend of orthodontic diagnosis and treatment planning, treatment objectives and assessment of treatment outcomes is towards an increasing emphasis on soft tissue relationships rather than underlying hard tissue relations. Earlier from writings of Dr. EH Angle it was clear that more focus was given on hard tissue relationship than soft tissues. According to EH Angle nature intends for all adults to have perfectly aligned dental arches that should mesh in ideal articulation with the teeth in the opposing jaws.

Parameter	Angle paradigm	Soft tissue paradigm
Primary treatment goal	Ideal dental occlusion	Normal soft tissue proportions and adaptations
Secondary goal	Ideal jaw relationships	Ideal soft tissue proportions define ideal hard tissues
Hard / soft tissue relationships	Ideal hard tissue proportions produce ideal soft tissues will be OK	Clinical examination of intra-oral and facial soft tissues
Diagnostic emphasis	Dental casts, cephalometric radiographs	Clinical examination of intra-oral and facial soft tissue
Treatment approach	Obtain ideal dental and skeletal relationships	Plan ideal soft tissues relation-ships and then place teeth and jaws as needed to achieve this
Function emphasis	TM joint in relation to dental occlusion	Soft tissue movement in relation to display of teeth
Stability of result	Related primarily to dental occlusion	Related primarily to soft tissue pressure/equilibrium effects

Figure 1. Comparison between Angle paradigm and Soft tissue paradigm (Mhatre *et al*., 2012)

Figure 2a

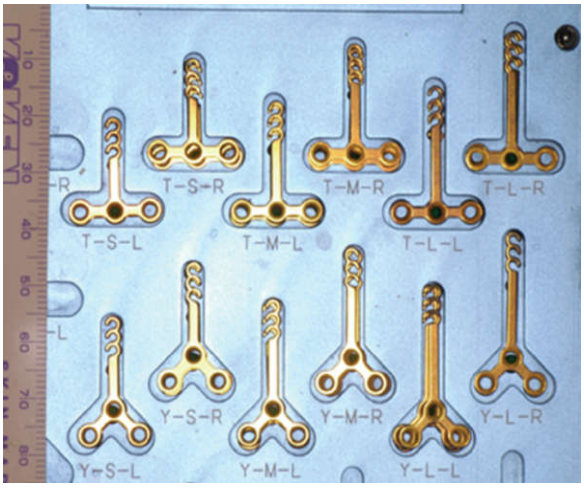

Figure 2b

Figure 2. (a) Mini implants in palatal anchorage. 2(b) Mini plates (Yamaguchi *et al*., 2012)

When this natural dentition state occurs, the face should also be in the perfect harmony and balance and the stomatognathic system should function ideally (Ackerman, 1999). According to MM Martha *et al*[2] while correcting the malocclusion orthodontically the facial balance may become worse. This could be due to ignored soft tissue relationship during diagnosis or lack of attention to the esthetic goals. So current trend in orthodontics is toward soft tissue relationship. Proffit[3] explained that this change in treatment goals towards soft tissues and away from dental and skeletal relations represent the paradigm shift. Thus in present days the treatment planning is considered on the basis of soft tissue limitations, changes in soft tissues that will occur after orthodontic treatment rather than skeletal and dental relations. These soft tissues generally affect the treatment in growing age. Various soft tissues attain maturity at different ages thus affects the treatment planning at different ages (Burrow, 2009). Guidelines for treatment planning depending upon soft tissues (Ackerman, 1997):

Size of nose and chin: If patient has large nose or chin protraction of incisors is indicated. One should avoid retraction of anteriors in such conditions.

Position of upper lip: Upper lip looks unaesthetic if it forms negative angle with true vertical line. So incisors should not be retracted beyond certain limit such that upper lip will make a negative angle with true vertical line.

Mentolabial Sulcus: Protruded lower incisors or lower jaw make the mentolabial Sulcus shallow which is unaesthetic thus proclination of lower incisors should be avoided if mentolabial Sulcus is shallow.

Smile Line: This is the most important feature in orthodontic treatment. Ideally 1-2 mm of gingiva should be visible during smile. More gingival display will lead to unaesthetic smile. Thus from above discussion it is clear that soft tissue plays an important role in orthodontic diagnosis and treatment

planning.Soft tissue assessment should be done in treatment planning and should be assessed along with hard tissue assessment.

Temporary anchorage devices: A temporary anchorage device (TAD) is a device that is temporarily fixed to bone for the purpose of enhancing orthodontic anchorage either by supporting the teeth of the reactive unit or by obviating the need for the reactive unit altogether, and which is subsequently removed after use (Cope, 2005). In past various anchorage devices has been used successfully. These involve extraoral as well as intraoral appliances. As early as 1728 Fauchard used expansion arch as anchorage device. Gunnell used occipital anchorage in 1822. In 1841 Schange used crib appliance as anchorage appliance. Desirabode in 1841 used teeth with longer and stronger roots as anchorage units and later in 1891 Angle perfected the occipital anchorage. All these appliances and various other modifications serve the purpose of anchorage but with some limitations like patient compliance especially with extraoral appliances and anchorage loss to some extent. Paradigm has shifted with introduction of mini implants in orthodontic world. Mini implants provide skeletal anchorage which is absolute anchorage with no movement of reactive units. Various forms of skeletal anchorage devices has been used like mini implants, mini plates etc. with the introduction of mini implants orthodontists are not only free from anchorage demanding cases but also enable orthodontist to have three dimensional control over tooth movement (Yamaguchi *et al*., 2012). Mini implants provide advantages like non compliant appliance, minimally invasive procedure, zero anchorage loss, less bulky than conventional appliances. Recent studies have shown that min implants provide superior anchorage in comparison to dental anchorage (Borsos *et al*., 2012), nance palatal button (Chopra *et al*., 2017) and headgear with transpalatal arch (Lee *et al*., 2013). Thus mini implants provide a better option for anchorage. One should incorporate the mini implants in routine practice to avoid compliance dependant bulky appliances for betterment of patients.

New paradigm in orthognathic surgery- surgery first approach: Earlier before 1960's no pre or post surgical orthodontics was practiced. After 1960 preand post operative orthodontic phase develops with edgewise appliance and new protocol for orthognathic procedures was developed including three phases: pre surgical orthodontics, orthognathic surgery and post surgical orthodontic phase. This traditional approach was very time consuming. Other limitations of traditional approach were like worsened facial profile during pre operative orthodontics and unsatisfying effects of pre operative phase. Thus after 2000's a new protocol was developed that does not include pre operative orthodontic phase known as surgery first approach (SFA). This SFA brings a new paradigm in orthognathic surgery field (Choi *et al*., 2015). Studies (Yu *et al*., 2015; Jeong *et al*., 2017) have shown a significant reduction in treatment time and increase in patient acceptance with surgery first approach. Sharma VK (Sharma *et al*., 2015) reported various problems associated with surgery first approach like difficulty in predicting final occlusion, time consuming treatment planning, compromised final occlusion with even minor surgical error and increase in number and complexity of osteotomy procedures. Ko EW (Ko, 2011) reported similar post treatment stability in Class III patients with or without pre surgical orthodontics. Thus surgery first approach provides short term treatment with better patient compliance and immediate results. So this surgery first approach should be adopted as routine surgical procedures.

Conclusion

New paradigms are continuously developing in orthodontics. Orthodontists are not just cosmetology technicians; it fits into health area specialty scope. New advances in the field are beneficial for both patient and clinician. So the paradigms should be accepted and incorporated into routine orthodontic practice.

REFERENCES

Ackerman JL, Proffit WR, Sarver DM. 1999. The Emerging Soft Tissue Paradigm in orthodontic diagnosis and treatment planning. *Clin. Orth. Res.,* 2.49-52.

Ackerman JL, Proffit WR. 1997. Soft tissue limitations in orthodontics: treatment planning guidelines. *Angle Orthod.,* 67(5):327–36.

Borsos G, Vokó Z, Gredes T, Kunert-Keil C, Vegh A. 2012. Tooth movement using palatal implant supported anchorage compared to conventional dental anchorage. Ann Anat Anat Anz Off Organ Anat Ges. Nov;194(6):556–60.

Burrow SJ. Biomechanics and paradigm shift in orthodontic treatment planning. J Clin.Ortho. 2009:10:635-44

Choi J, Hong S, Min C. 2015. New paradigm in the treatment of dentofacial deformities: a patient oriented physiological approach (POPA). *Int J Oral Maxillofac Surg.,* Oct 1;44:e48.

Chopra SS, Mukherjee M, Mitra R, Kochar GD, Kadu A. 2017. Comparative evaluation of anchorage reinforcement between orthodontic implants and conventional anchorage in orthodontic management of bimaxillarydentoalveolar protrusion. *Med J Armed Forces India*. Apr 1;73(2):159–66.

Cope JB. 2005. Temporary Anchorage Devices in Orthodontics: A Paradigm Shift. *Semin Orthod*., 11:3-9

Jeong WS, Choi JW, Kim DY, Lee JY, Kwon SM. 2017. Can a surgery-first orthognathic approach reduce the total treatment time? *Int J Oral Maxillofac Surg.,* Apr 1;46(4):473–82.

Ko EW-C, Hsu SS-P, Hsieh H-Y, Wang YC, Huang CS, Chen YR. 2011. Comparison of progressive cephalometric changes and postsurgical stability of skeletal Class III correction with and without presurgical orthodontic treatment. *J Oral Maxillofac Surg.,* May;69(5):1469–77.

Lee J, Miyazawa K, Tabuchi M, Kawaguchi M, Shibata M, Goto S. 2013. Midpalatalminiscrews and high-pull headgear for anteroposterior and vertical anchorage control: cephalometric comparisons of treatment changes. *Am J Orthod Dentofac Orthop* Aug;144(2):238–50.

Mejia-Maidl M, Evans CA. 2000. Soft tissue facial considerations andorthodontic treatment. *Semin Orthod*. Mar 1;6(1):3–20.

Mhatre A, Tandur A, Gaikwad S, Doshi S, Khushalani N. 2012. Orthodontic treatment: The soft tissue paradigm. *Journal of contemporary dentistry*. Jan-Apr 2:1: 43-6

Proffit WR. Contemporary Orthodontics - 5th Edition

Sharma VK, Yadav K, Tandon P. 2015. An overview of surgery-first approach: Recent advances in orthognathic surgery. *J Orthod Sci.,* 4(1):9–12.

Yamaguchi M, Inami T, Ito K, Kasai K, Tanimoto Y. 2012. Mini-Implants in the Anchorage Armamentarium: New Paradigms in the Orthodontics. *Int J Biomater.,* 1-8

Yu HB, Mao LX, Wang XD, Fang B, Shen SG. 2015. The surgery-first approach in orthognathic surgery: a retrospective study of 50 cases. *Int J Oral Maxillofac Surg*., Dec;44(12):1463–7.

****