

REVIEW ARTICLE

A REVIEW OF ADULT ORTHODONTICS - ROLE OF THE GENERAL DENTAL PRACTITIONER

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ABSTRACT

There has been an increased awareness of orthodontic treatment for adults in the last 20 years. Is it possible for all adult patients to benefit from orthodontic therapy? The purpose of this paper is to review adult orthodontic treatment so that general Dentists will be better prepared to recognize and also refer adult patients that can benefit from orthodontic therapy. A review of previous studies done on adult orthodontic including the prevalence of adult malocclusion, reasons why adults do not seek orthodontic treatment and types of adult orthodontic treatment needs was undertaken. Adult orthodontic treatment was compared with adolescent orthodontic treatment. A review of treatment outcome of adult orthodontic patients showed that most patients felt satisfied with the treatment. Some reported appliance discomfort which eased off 2 to 3 days after treatment. Adjunctive and comprehensive orthodontic treatment are the main types of orthodontic therapy recommended for adult malocclusion. The General Dental Practitioner is the first contact with most patients, it is their role to determine which patient may benefit from orthodontic therapy and refer to the specialist appropriately.

KEYWORDS: *Review, Adult Orthodontics, General Dental Practitioner*

INTRODUCTION

In our present society, a person's dentition is an important component, which can markedly affect his or her self-esteem. Interestingly also there has been an increasing awareness of orthodontic treatment for adults in the last 20 years^{1,2}. The proportion of adults seeking orthodontic in the U. S. rose from 5% in 1970, to a peak of 25% in 1990¹⁻⁶. The major reasons attributed to this rise are firstly, an increased social awareness of the availability of orthodontic treatment. Secondly, an appreciation of how orthodontic treatment can facilitate other dental treatment to maintain the dentition e.g. (teeth with periodontal problems) and thirdly an improvement in the fabrication and appearance of orthodontic appliances⁷. Some studies⁸ have shown that about 50% of adults who seek treatment on their own volition do have a positive self-image and have reasonable expectations regarding the outcome of treatment^{3,9}. The primary motivation for adult seeking orthodontic treatment is to improve their dental and facial aesthetics, other motivations in decreasing order include psychosocial factors and dental/periodontal health. A major factor, therefore in the decision of an adult to seek orthodontic treatment would be the amount and quality of information available. Some studies^{6,15} have shown that such adults who seek orthodontic treatment on their own relied on the general practitioner for referrals. Therefore the general practitioner, being the first contact with the patient, must play an integral role of identifying and recognising adults who might benefit from orthodontic treatment, as well as referring and arranging orthodontic consultation for such patients. Therefore it is very

important that such dentists understand the indication and contraindications as well as the consequence of orthodontic therapy for adults.

The aim of this paper therefore, is to review adult orthodontic treatment, so that dental practitioners may be better prepared to identify, and recognise adult patients who will benefit from orthodontic treatment, and refer such patients to the specialist.

PREVALENCE OF MALOCCLUSION

Recent studies have shown that prevalence of malocclusion in adults is quite similar to that in children and adolescents⁹. In the U.S. Searcy and Chick¹⁰ found that 77% of U.S. Army recruits had a malocclusion that could benefit from orthodontic treatment while 16% were judged to have a severe or handicapping malocclusion. Only 43% of U.S. adults had ideal incisor overjet while 50% had excessive overjet and 6% had a reverse overjet. In western Europe the prevalence of adult malocclusion is between 40-76%^{11,12}. Data collectively obtained from the Third U.S. National health and Nutrition examination survey (NHANES III) suggests that two-thirds to three-fourth of the adults possess some form of malocclusion⁷.

Presently in Nigeria there is no published data on prevalence of malocclusion in adults, though several studies have been done on prevalence of malocclusion in children and adolescents^{13,15}. Dacosta¹⁷ in her study of prevalence of malocclusion among 11-18 years old in Northern Nigeria recorded that 84% of the children had Angle's Class I malocclusion, 17% had Angle's class II while 2% had class III malocclusion¹⁷. The predominant inter-arch problems in adults in the United States and Western Europe is crowding followed by spacing, cross bite and rotated teeth⁷, while in

Nigeria the predominant interarch problem is spacing, followed by crowding and Bi-maxillary protrusion^{1,7}. The Prevalence of adult malocclusion confirms that adult patients do require treatment and may actually benefit from orthodontic treatment given to younger patients.³

TYPES OF ORTHODONTIC TREATMENT

Adult orthodontic treatment can be classified as adjunctive and comprehensive. Adjunctive treatment is the movement of teeth to facilitate other dental procedures necessary to control disease or restore function for example, when teeth are crowded, rotated or malaligned. Plaque control may be more difficult leading to increased incidence of caries or periodontal disease. Adjunctive treatment is then performed by moving the crowded teeth to allow more efficient cleaning so as to avoid periodontal disease and caries. Also, it can be movement of a tooth to establish a favourable crown to root ratio and vertical orientation so that occlusal forces are transmitted along the long axis of the tooth^{1,8}. Comprehensive treatment on the other hand is the effort to make the patient's occlusion as ideal as possible, repositioning all or nearly all the teeth in the process.

TYPES OF ADULT ORTHODONTIC TREATMENT

	ADJUNCTIVE TREATMENT	COMPREHENSIVE TREATMENT
Goal	To facilitate disease control and restoration of function	To achieve ideal occlusion
Performed by	General Dental Practitioner/ Orthodontist	Orthodontic specialist
Extent of Appliances	Less than a full arch	One or both arches
Type of Appliances	Mostly removable	Mostly fixed Appliances
Timing	3 - 6 months	8 - 36 months
Type of Problems	Extrusion, Molar uprighting, Space redistribution, Incisor alignment	Open bite, Deep bite, Class II or class III Malocclusion, Skeletal excess or deficiency

INDICATIONS FOR ADJUNCTIVE TREATMENT

Adjunctive orthodontic treatment will include treatment of excessive tooth wear, pulpitis is associated with occlusal trauma, drifting of teeth after extraction, insufficient tooth structure, cross bite or malalignment of anterior teeth, Repositioning of adjacent teeth prior to implant restoration, extruding tooth. Adjunctive treatment may be within the scope of the general dental practitioner. Therefore there is a need for the general dental practitioner to be able to identify the need for adjunctive treatment and perform it, when necessary.

Comprehensive treatment on the other hand should be performed by specialist orthodontist only, with the goal of achieving an ideal occlusal relationship and longer term dento-alveolar stability. Comprehensive treatment usually takes a longer time when compared to adjunctive treatment.

INDICATIONS FOR COMPREHENSIVE TREATMENT

Comprehensive orthodontic treatment is indicated for those malocclusions that produce: unacceptable aesthetics, reduced

masticatory function, those malocclusion that compromise oral health for example angles class III malocclusion with protruding incisor which predisposes easily to trauma and periodontal breakdown due to deep, impinging overbite, it is also indicated where there is an association between TMJ dysfunction and class III malocclusion cross bite or open bite⁹.

In one study, approximately one third of the adult patients sought treatment because of functional complaints associated with malocclusion⁸.

WHAT ARE THE DIFFERENCES BETWEEN ADOLESCENT AND ADULT PATIENTS?

Even though adults have some form of cranial and facial growth, it is of little value in correcting skeletal and dental malocclusion⁷. The contrast is however true for young children and adolescents where growth modification is often successful. Adults presenting with Angle's class II or class III skeletal discrepancy may require orthognatic surgery or orthodontic camouflage in which case the patient will settle for less than ideal situation.

However, for most adults presenting with class I malocclusion with spacing or crowding lack of growth will have little or no impact on the outcome of orthodontic treatment. Another important difference between adults and adolescents is the increased prevalence of periodontal diseases in adults. Adjunctive treatment may therefore be necessary, for example molar uprighting to facilitate access for good oral hygiene procedures¹⁹. It is very important that periodontal diseases is under control before orthodontic therapy is started, even though localised bone loss does not preclude orthodontic therapy¹⁵. However most orthodontic appliances render plaque control more difficult especially in children and adolescents. Adults however, tend to be more compliant with oral hygiene procedures. For most adults, bonded brackets are indicated on the molar tooth because of the higher crown height. This often leads to less plaque accumulation when compared to children and adolescents who have to wear orthodontic bands^{1,9}.

Aging is associated with biochemical changes such as decreased alveolar vascularity and blood flow altered bone mineralisation and increased collagen rigidity. These changes have not been found to impede orthodontic treatment^{16,19}.

There is the common perception that duration of treatment for adults is longer than that of adolescents^{1,2}. However, studies have shown that there is no significant difference in the duration of treatment for adults and adolescents because several studies comparing adult and adolescent orthodontic patients during and after treatment found no significant age-dependent changes in root length, gingival blood flow, periodontal attachment loss or post treatment stability^{1,8,21}. Adults are more likely to present with chronic medical problems, just like periodontal treatment once the patient is under control and regular medical care, orthodontic treatment can be instituted. Orthodontic tooth movement is also affected by certain drugs used only by adults, for example the Prostaglandin - inhibitors used for athletes (e.g. Indomethacin) and (alendronate) inhibitors of bone resorption used to treat osteoporosis.

WHAT ARE THE TREATMENT CONCERNS FOR ADULTS?

Breece and Niebeg^{1,6}; in their study reported that about 50% of adults would feel embarrassed by wearing orthodontic appliance. However out of the adults who sought treatment on their own, only about 20% felt the appliance had adverse social effect, but their families and friends were usually very supportive^{16, 24, 25}.

Today, with increased social acceptance of orthodontic therapy there has been an increase in adult patients seeking orthodontic treatment and this has diminished some of the fear of embarrassment. The design of the brackets are much more smaller and more aesthetically pleasing than it was a decade ago this making it more acceptable to the patient. Transparent / tooth coloured ceramic brackets as well as lingual appliances has made orthodontic therapy less noticeable.

Additional reasons given by adults for not seeking treatment include lack of awareness, high cost, duration of treatment and fear of pain^{1,8}. Although it is true that adult orthodontic therapy can be lengthy, for most patients the time passes rapidly^{2,4}. Orthodontic treatment can cause discomfort especially after placement of the appliance and during periodic adjustment. Recent studies on patients on orthodontic therapy showed that appliance discomfort is mild and not lasting more than 2 days^{1,8,2,4,2,5}. The discomfort is usually relieved by analgesics and placing the patient on a soft diet.

TREATMENT OUTCOME

For orthodontic treatment to be considered successful orthodontic it must achieve its objective and subjective goals identified at the start of treatment. Objective goals are defined by the orthodontist e.g ideal class 1 incisor and molar relationship. Breece and Niebeg^{1,6}; in their study stated that nearly 100% of adults that received orthodontic treatment confirmed that if they had to undergo orthodontic treatment all over again they wouldn't mind. Subjective goals are defined by the patients e.g facial attractiveness. Also several studies have shown that after orthodontic treatment such adults possess a more positive self-image, improved body image, greater self-confidence, better career opportunities and social life^{1,8,2,6}. Most adult patients who complete orthodontic therapy place great value on their dentition and are highly motivated with regards to maintaining good oral hygiene and seeking professional advice⁷. Thus facilitating orthodontic therapy for adults who can benefit clearly aids both the patient and the general dental practitioner.

CONCLUSION

Many adults possess dental malocclusion that can be corrected by orthodontic treatment, either through adjunctive or comprehensive orthodontic treatment. It is no longer unusual to see adults who wear orthodontic appliance, and majority of adults who have gone on orthodontic therapy are pleased with the outcome. It is also within the scope of the general dental practitioner to recommend orthodontic treatment and therefore they should not hesitate to refer such adults especially when it is likely to improve their dental and periodontal health or provide psychosocial benefit.

REFERENCES

1. **Nattrass C, Sandy JR:** Adult orthodontics a review. *Br. J. Ortho.* 1995; 22; 331-7.
2. **Norton LA:** The effect of aging cellular mechanisms on tooth movement. *Dent Clin North Am* 1988. 32:437;46.
3. **Proffit WR:** Special considerations in comprehensive treatment of adults to Contemporary orthodontics 2nd ed St. Louis Mosby - Year Book. 1993; 585-606.
4. **Gottlieb EL, Vogels S:** 1983 JCO orthodontic practice study Part 1. *Trends J. Clin-Orthod* 1984; 18;167-73.
5. **Gottlieb EL, Nelson AH, Vogels DS III:** 1990 JCO Orthodontic practice study. Part 1 results and trends. *J. Clin Orthod* 1991, 25; 145-56.
6. **Gottlieb EL, Nelson AH, Vogels DS III:** 1997 JCO orthodontic practice study, .
7. **Burkitts TM, Profit WR:** Referring; Adult patients for orthodontic treatment; *Journal of the American Dental Association* 199, 130(1); 73-79.
8. **Sergl HG., Zentner A:** Study of psychosocial aspects of adult orthodontic treatment; *Int. J: Adult orthodon orthognath Surg* 1997;12; 17-22.
9. **McLain JB; Profit WR:** Oral health status in the United States, prevalence of malocclusion *J.Dent Edu* 1985;49; 386,96.
10. **Searcy VL, Chisick MC:** Perceived, desired and normatively determined orthodontic treatment needs in male U.S. Army recruit. *Community Dent Epidemiol* 1994;22;437-40.
11. **Brunelle JA, Bhat M, Lipton JA:** Prevalence and distribution of selection occlusal characteristics in the U.S. Population, 1988-1991. *J.Dent Res* 1996;75(special issue); 706-13.
12. **Proffit WR, Fields HW Jr., Moray LJ:** Malocclusion prevalence and orthodontic treatment need in the United States estimates from the NHANES III survey *Int J. Adult Orthodon Orthognath Surg* 1998; 13;97-106.
13. **Richardson A, Ana J:** Occlusion and malocclusion in Lagos *Journal of Dentistry*, 1973, I; 134-139.
14. **Aggarwal SP, Odusanya S. A:** Orthodontic status of school children in Ile-Ife, Nigeria *Acta Odont Paediat* 1987, 6; 9-12.
15. **Isiekwe MC:** Malocclusion in Lagos; Nigeria community *Dent Oral Epidemiol* 1983; 11: 59-62.
16. **Breece GL, Niebeg LG:** Motivations for adult orthodontic treatment; *J Clin orthod* 1986; 20; 166-71.

17. **Dacosta O:** Prevalence of malocclusion among 11 - 18 years old in a Nigeria population. *W. Afr. J. Med.* 1999; 18(2);91-6.
18. **Harris EF; Baker WC:** Loss of root length and crestal bone height before and during treatment in adolescent and adult orthodontic patients. *Am Orthod Dentofacial Orthop* 1990;98 463-9.
19. **Tulloch JFC:** Adjunctive treatment for adults. In *Contemporary orthodontics* 2nd ed St. Louis Mosby Year Book 1993, 65-84.
20. **Boyd Rt., Leggott PJ, Quinn RS Eakle WS, Chambers D:** Periodontal implications of orthodontic treatment in adults with reduced or normal periodontal tissues versus those of adolescents. *Am J. Orthod Dentofacial Orthop* 1989, 96, 191-9.
21. **Yamaguchi K, Nanda RS:** Blood flow changes in gingival tissues due to the displacement of teeth. *Angle Orthod* 1992,62;257-64.
22. **Harris EF, Vaden JI:** Post-treatment stability in adult and adolescent orthodontic patients a cast analysis. *Int. J. Adult Orthodon Orthognath surg* 1994;9;19-20.
23. **Lupi JI, Handelman CS, Sadowsky C:** Prevalence and severity of apical root resorption and alveolar bone loss in orthodontically treated adults. *Am J Orthod Dentofacial Orthop* 1996; 109; 28-37.
24. **Chumbley AB, Tuncay OC:** The effect of indomethacin (an Aspirin-like drug) on the rate of orthodontic tooth movement. *Am J Orthod* 1986,89; 312-4.
25. **Tayer BH, Burek MJ:** A survey of adults' attitudes toward orthodontic therapy. *Am J Orthod* 1981; 79;305-15.
26. **Brown DF, Moerenhout RG:** The pain experience and psychological adjustment to orthodontic treatment of preadolescents; adolescents and adults. *Am J Orthod Dentofacial Orthop* 1991; 100;34956.
27. **Varela M, Garcia-Camba JE:** Impact of orthodontic on the psychologic profile of adult patients; a prospective study. *Am. J. Orthod Dentofacial Orthop* 1995; 108; 142-8.