

Taurodontism and Periodontal Management

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Abstract: Taurodontism is a condition that found in teeth where the body of the tooth and pulp chamber is enlarged. Endodontic and periodontal treatment of these teeth is difficult and challenging. In this study, researchers discuss about periodontal problems of this condition.

Key words: Connective tissue, endodontic, gingiva, periodontal disease, teeth, Iran

INTRODUCTION

Taurodontism is a condition that found in teeth where the body of the tooth and pulp chamber is enlarged. As a result, the floor of the pulp and the furcation of the tooth are moved apically down the root. Bifurcation and trifurcation of roots to the CEJ is greater than the occlusal-cervical distance (Mena, 1971). The term means bull like teeth derived from similarity of these teeth to those of ungulate or cud chewing animals. As a dental classification taurodontism is a developmental anomaly in size and form (Neville *et al.*, 2009).

Taurodontism from endodontic aspect cause challenge in root canal and no data present so far regarding aspect of periodontal management and effect of taurodontism in periodontal treatment. This study review taurodontism and periodontal management. This anomaly was first reported by Gorjanovic-Kramberger and then the term taurodontism was first coined by Mark (1981) and Keith (1913). Taurodont molars were first found and examined radiographically in 1906 (Constant and Grine, 2001).

Senyurek (1939) noted taurodontism in the teeth of ancient Egyptians. The incidence to be as high as 30% in hybrids of Australoids and the Bush people of South Africa (Shaw, 1928), 11.3% among Saudi Arabian dental patients (Ruprecht *et al.*, 1987), 9% in the United States (Halks and Brooks, 1988), 48% in Senagalese dental patients aged 15-19 years (Toure *et al.*, 2000), 8% in Jordanians was determined (Darwazeh *et al.*, 1998) and 56% of female and 36% of male Chinese (MacDonald-Jankowski and Li, 1993).

Taurodontism appears most frequently as an isolated anomaly but it has also been found to occur as a part of several well known syndromes due to alterations of sex

chromosomes, such as Klinefelter's syndrome, Trichonchyto-dental syndrome, Lowe syndrome and hereditary ectodermal dysplasia (Aldred *et al.*, 2002; So-Chiao and Te-Yao, 1999; Koshiba *et al.*, 1978; Tsai and O'Donnell, 1997; Stenvick *et al.*, 1978).

Shaw (1928) classified this condition according to degree of apical location of pulpal floor as hypotaurodontism, mesotaurodontism and hypertaurodontism (Fig. 1) (Cobb, 1996). Keene (1966) devised a Taurodont index that related the height of the pulp chamber to the length of the longest root and recognized four proportionally equivalent categories.

Thus, molars with an index value of 0-24.9%, 25-49.9, 50-74.9 and 75-100% were classified as cynodont (normal), hypotaurodont, mesotaurodont and hypertaurodont, respectively (Fig. 2) (Keene, 1966). According to Shifman and Chanannel (1978)'s classification, if the distance from the lowest point of pulp chamber to the highest point of the chamber when divided by the distance from the occlusal end of the pulp chamber (roof of chamber) to the apex should be equal or >0.2 mm and/or if the distance from the highest point of the pulp chamber floor to cemento-enamel junction is >2.5 mm (Fig. 3).

Theories regarding the etiology of taurodontism have been suggested that the anomaly represents a primitive pattern, a mutation an atavistic feature an X-linked trait, familial or an autosomal dominant trait, heredity condition expressed by a polygenic system (Blumberg *et al.*, 1971). Reichart and Quast (1975) did not rule out environmental factors such as presence of infection during the tooth development. The most commonly accepted theory is based on the alteration in the Hertwiges epithelial root sheath involving a failure of the epithelial diaphragm to form a bridge prior to dentin deposition results in large

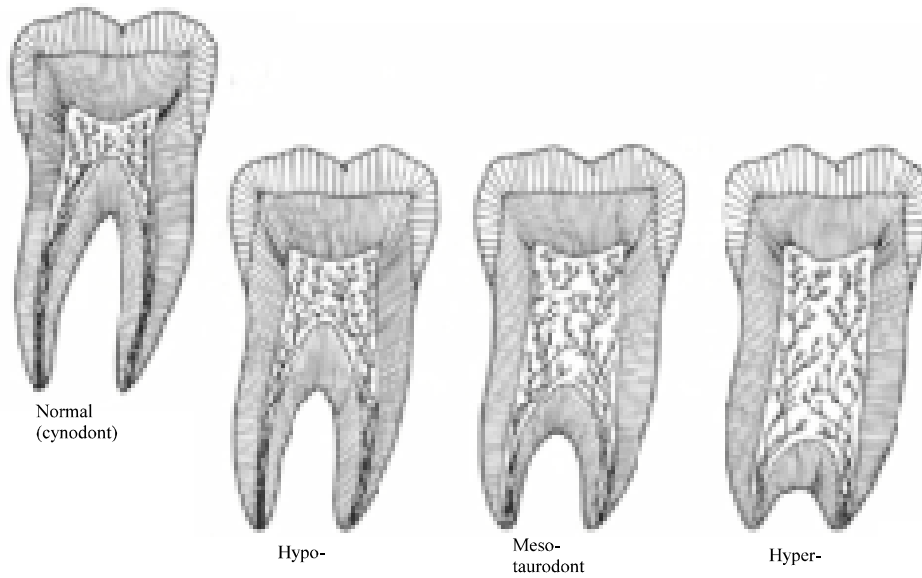


Fig. 1: Height of the pulp chamber to the length of the lowest root

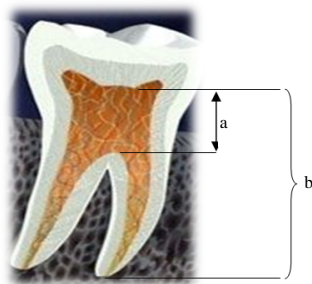


Fig. 2: Malars classification

pulp chambers (Goldstein and Gotlieb, 1973). The morphology of the pulp chamber may pose a challenge to endodontic treatment for this reason advocated vital pupotomy rather than pulpectomy in endodontically involvement (Shafer *et al.*, 1983). A taurodontism does not exhibit any morphologic clinical characteristics thus radiographic examination is the only way to visualize configuration of the pulp chamber.

Ackerman *et al.* (1973) believed that tooth root morphology is primarily determined genetically but that it may be environmentally modified. An inheritable etiology could not be elicited as the families of the patients were not available for examination (Hayashi, 1994).

The teeth most frequently affected are the molars, although it can be occasionally seen in premolar and incisors and are mostly diagnosed by radiographic study (Tsesis *et al.*, 2003). Taurodontism from an endodontic aspect presents challenge in root canal and endodontic therapy in this situation should be conservative.

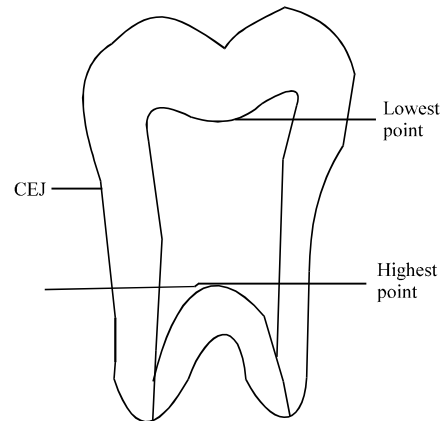


Fig. 3: Pulp chamber

A patient with periodontal disease and taurodontism teeth from regarding aspect of periodontal management, furcation areas some of greatest challenge to success of periodontal therapy and in several studies, tooth loss and high mortality and compromised prognosis have been reported (Svardstrom and Wennstrom, 2000). Additionally, reduced efficacy of periodontal therapy has been consistently found in multirooted teeth with furcation involvement may restrict access for adequate debridement and root instrumentation and may have a reduced source of available cells and blood supply from the periodontal ligament and bone defect (Ramfjord *et al.*, 1987; Novaes *et al.*, 2005).

Cobb (1996) reveals that lack of proper access due to furcation anatomy and persistence of microbial flora reason for compromised results in furcation. The

significance of root trunk length related to prognosis and treatment. The pulpal status of the tooth needs to be diagnosed when there is furcation involvement because the furcation lesion will often repair with successful endodontic therapy if the damage is due to pulpal necrosis.

If the damage is due to periodontal surgical treatment of the furcation-involved molars (pocket elimination surgery, tunneling procedures and root resection) has targeted increased access for home care and efforts to regain lost clinical attachment through guided tissue procedures. Wang *et al.* (1994) studied the molars with furcation involvement and effects of various surgical approaches and noted that were 2.5 times more likely to be lost during the 8 years study period.

A tooth with a short root trunk is more vulnerable to furcation involvement but has a better prognosis after treatment since less periodontal destruction has presumably occurred. Taurodontism teeth with a long root trunk and short roots and furcation are located at apical level may not be a candidate for root resection since, these teeth lose more periodontal support with furcal invasion. The distance of furcation roof to crest of bone was associated with probability of complete furcation closure (Mardam-Bey *et al.*, 1991). Over 90% of defects with this measurement of 2 mm or less demonstrated complete furcation closure, compared to 67% of sites with a measurement of 3 mm or more. Early diagnosis and periodontal follow up and maintenance were an important factor to decrease of bone loss and teeth loss because furcation treatment is very complicated.

Tunneling procedures and root resection for these short root teeth do not applicable and for distance from crest regeneration procedure had undesirable prognosis. In furcation involvement non surgical treatment may be good choice than pocket reduction. The amount and quality of the gingival tissue is also important. Inadequate gingival width and thin keratinized tissue should be analyzed because it can lead to gingival recession. Most gingival recessions which occur during an orthodontic treatment had been shown to occur in the regions of the anterior upper and lower teeth (Sadovsky and BeGole, 1981).

Anderegg *et al.* (1995) demonstrated that for tissue thickness >1 mm, there is less post treatment recession in compare with tissue thickness less than or equal to 1 mm. Novaes *et al.* (2005) reported that flaps with thin connective tissue are at greater risk for inflammation induced post surgery recession than thick flaps. Dannan confirm that If a minimal zone of attached gingiva or thin tissue exists, a free gingival graft that enhances the type

of tissue around the tooth helps control inflammation and this should be done before any orthodontic movement is begun. Endodontic treatment in taurodont teeth has been described as complex and difficult. Durr suggested that the for morphology of pulp and location of the orifices thus, instrumentation and obturation may be difficult. The number of root canals varied in each case.

CONCLUSION

Taurodontism do not effect on periodontium but can influence treatment plan and prognosis. In orthodontic cases with taurodontism recommended that examined gingival and bone before treatment and in periodontal disease patients as soon as possible control disease and evaluate bone loss and soft tissue graft if needed before orthodontics treatment. If did not It could have negative effects on the periodontium such as gingivitis, gingival recessions and bone dehiscence. The patients must be aware that periodontal treatment and follow up increased success of orthodontics treatment.

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