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Intrusion of posterior teeth with magnets supported by osseointegrated implants

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INTRODUCTION

Magnets have been used in dentistry for many years to push or pull teeth. In Orthodontics they are used to intrude or to move teeth along archwires, to produce expansion or to provide retention (1,2,3). Magnets show predictable force levels that do not decay over the time. Several animal and clinical studies in human being have documented the reliability of using magnetic forces for different orthodontic purposes (4,5). Intrusion of posterior teeth seems to be one of the most promising applications (6).

Osseointegrated implants may provide ideal orthodontic anchorage since they are incapable of movements within bone. Animal studies and human trials have demonstrated that endosseous implants can be efficiently used as anchorage in horizontal (mesio-distal) orthodontic movements (7,8,9).

The aim of this study is to present a case where vertical movement (molar intrusion) was obtained using repelling magnets positioned on natural teeth and reciprocally on implant abutments.

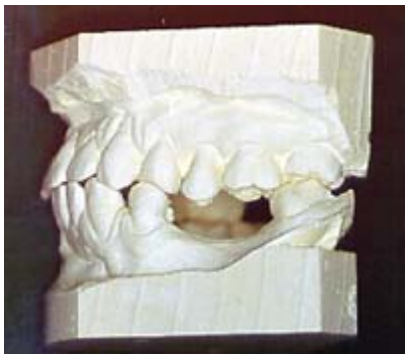


fig.1

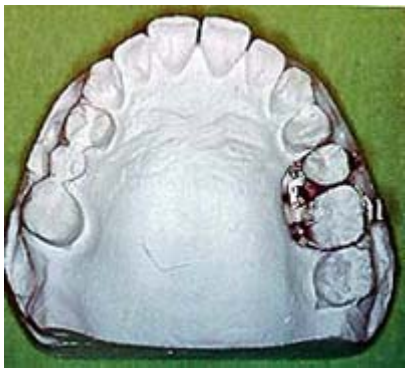
CASE REPORT

C.P. 52,3 years old. Female

This patient was referred for an orthodontic consultation regarding supraeruption of the maxillary left second bicuspid and first molar.

It was determined that she necessitated intrusion of these teeth to establish adequate space for prosthetic reconstruction of the mandibular left quadrant (second bicuspid and first molar) (Fig 1).

Two osseointegrated implants (ETA Exacta CV1) of 11-mm length were placed in the lower arch. These implants would be used to support a repelling magnet during orthodontics as well as the final prostheses.



Following healing and confirmation of osseointegration, 2 plastic abutements (acrylic healing caps) were inserted on the implants. One of the repelling magnets was attached to these abutments with cold-cure acrylic resin. (Fig 2)

fig.2 fig.3

In the maxillary arch, two orthodontic bands (Washbone$^{\hat{O}}$, Ormco) were cemented around the second bicuspid and the first molar. The other repelling magnet was bonded to the lingual surface, again using cold-cure acrylic resin (Fig 3).

Due to the repelling forces of the magnets, an open-bite was present immediately following their placement (fig 4). After 3 months time, the magnets produced effective intrusion of the supraerupted teeth and the open-bite resolved (Fig 5).

fig.4 fig.5

DISCUSSION

Although magnets are potentially useful, the force produced between two magnets falls dramatically with an increase in their distance or with an imperfect alignment. Three-dimensional control is quite limited when magnets are in a repulsive configuration. Implants can be helpful in reducing treatment time and avoiding any deleterious effects on natural teeth that would otherwise be used as anchorage during orthodontic treatment.

ETA Exacta is a dental root-form implant made of pure titanium. It is available in 4 different diameters: 3,3mm 4.0mm 4.7mm 5.6mm of 4 different lengths: 9.0mm 11.0mm 13.0mm and 15.0mm. Prosthodontic abutments are connected to a hexagonal cylinder and secured with a trans-abutment screw. In addition to the usual metallic healing caps, ETA Exacta system an acrylic abutment is available. It can be adapted for orthodontic bands and converted to a temporary or definitive prosthetic restoration with simple and inexpensive in-office procedures (10).

Other advantages for its use as an orthodontic anchor are:

· it is comfortable and provides convenient anchorage,

· the abutment is inexpensive (it is made of acrylic resin),

· it offers aesthetic results (temporary crowns can be cemented),

· it reduces chances of breakage,
· it requires adjustments approximately every 6 weeks

The main disadvantages are the costs of the surgical procedure (implant placement), the implant healing time (3-6 months), and it's' contraindication for use in young patients: implants are recommended in patients over the age of 18.

This inexpensive and simple-to-manage tool provides an efficient and comfortable solution to orthodontic anchorage. The compact sectional orthodontic mechanics showed in the above case was quick, convenient, comfortable and effective.

BIBLIOGRAPHY

1. Noar JH, Evans RD Rare earth magnets in orthodontics: an overview. Br J Orthod.1999; 26: 29-37
2. Darendeliler MA, Darendeliler A, Mandurino M. Clinical application of magnets in orthodontics and biological implications: a review. Eur J Orthod. 1997; 19: 431-442
3. Gianellly AA, Vaitas AS, Thomas WM. The use of magnets move molars distally. Am J Orthod Dentofac Orthop. 1989; 96: 161-167
4.Woods MG Nanda RS. Intrusion of posterior teeth with magnets: an experiment in non growing baboons. Am J Ortod Dentofac Orthop. 1991; 100: 393-400
5. Breunig A, Rakosi T. Die Behandlung des offenes Bisses mit Magneten. Fortschritte Kieferorthop 1992; 53: 179-186
6. Noar JH Shell N, Hunt np. The physical properties and behavior of magnets used in the treatment of anterior open bite. Am J Orthod Dentofac Orthop 1996; 109: 437-444
7. Turley PK, Kean C et al. Orthodontic force application to titanium endosseous implants. Angle Orthod 1989; 59 : 247-55
8. Higuchi KW, Slack JM. The use of titanium fixtures for intraoral anchorage to facilitate orthodontic tooth movement. Int J Oral & Maxillofac Implants 1991; 6.338-44.
9. Roberts W.E, Nelson C.L., Goodacre C.J. Rigid implant anchorage to close mandibular first molar extraction site. J.Clinic. Orthod.1994 ; XXVIII: 12:693-696
10. Mazzocchi A.R, Bernini S. Osseointegrated Implants for maximum orthodontic anchorage. J Clinic. Orthod.1998; Vol XXXII N.7: 412-415

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