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Self-ligating techniques: comparison in patients with maxillo-mandibular deformities.

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ABSTRACT

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It is not possible to standardize the sequence and duration of each wire because of the amount of the variables influencing; the initial choice is dictated primarily by the clinical situation: the degree of crowding (evaluated by the Little index (1))has an inverse relationship to wire size. The transition to the next wireÂ must take place when the first stops working actively; we will have a new clinical situation, a different degree of crowding and a different size needed. We can therefore say that there are no standard protocols in the application time for the first archwire. Reduction of the friction in self-ligating / low-friction techniques compared to conventional techniques is determined by several factors including the design of the brackets, the wire section and the severity of the malocclusion. The observation of the clinical situation is the basic parameter that must guide the clinician in choosing the archwire to use at the beginning and the moment when it is necessary switch to the next archwire.

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INTRODUCTION

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Currently, the majority of patients with maxillo-facial deformities are treated with self-ligating methods, while traditional technique is reserved only to those patients with few dental elements or in the cases in which the treatment with self-ligating techniques would be, in economic terms, not beneficial. The prevalent use of these techniques is the result of the fact that, in patients with facial maxillo deformities, muscular forces contrast the orthodontic movement because the musculature has developed in function of the malocclusion.

Low-friction techniques are more favorable, especially if associated with the "Surgery first" methodology. Dental problems of skeletal malocclusion are corrected after surgical intervention, keeping Â mild levels of strength , and resulting biologically compatible andÂ in harmony withÂ the functions of all perioral muscolature. Its physiological movements add up the muscular forces in compensating for the new occlusion created after surgical intervention.

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DISCUSSION

There are few studies in the literature where clinical experiences with interactive self-legating techniques are reported (10). The recommended sequences in the initial steps for the technique used (Empower) are 0.014 -0.018 Niti (Christensen), 0.012, 0.014 or 0.016 Niti as initial to pass to a ThNiTi(Cozzani) 016x016 and 0.014 or 0.016 ThNiti and then 016x022 ThNiti (Romero). So the archwire 0,013 is Â used only in patients treated with Damon equipment because the Empower technique does not foresee the use of this archwire as initial, and it is used in cases of severely crowded arches (Garcia Espejo); it is generally followed in the Damon indicated sequence by an archwire 0.016CuNiti as the second archwire for completing the initial alignment and leveling. The application time is about 6 months, justified by Â the complexity of the shortage and the misalignment of the arch. The result is the same even applied to the lower arch. Therefore, the use of this archwire provides an increased time necessary to change the archwire compared to the average time: this is because the complexity of the arch requires a longer time for the resolution of the shortage. However, a larger round wire for the completion of the first phase is necessary.

The 0.016 archwire can be applied for a lower degree of crowding, although Damon technique Â does not provide for it, which allows full yarn engagement without creating angles alive. However, the application time is long, 7 months for the upper arch and 4.4 for the lower arch because of the higher friction resistances for the increased contact surface between wire and bracket, and so the probable presence of the

notching phenomenon.

The 0.014 archwire is the most commonly used in our wire sequence in both techniques, with a lower time of use before passing to the second archwire in both arches and techniques. The fact that this is the most frequently used archwire and the most effective in terms of speed in the early stages of treatment is compatible with its intermediate size, not too small as a 0.012 or a 0.013, and not too great like a 0.016. The intermediate size guarantees Â free movement archwireÂ in the slot (that self-ligating techniques allow), that is essential in alignment and leveling. At the same time, it also guarantees the strength required to control the tooth in its movement during the beginning of orthodontic movements in the early stages. An intermediate dimension archwire also corresponds to an intermediate clinical crowding situation, which therefore requires minor forces and time for alignment.

This is confirmed by most of the studies analyzed, where the first archwire was usually the archwire 0.014 CuNiTi (2) (7) (8) (9) (10) (11) (3) (6) (11) (13).

In the lower arch as confirmed by more authors, the time of use of the first archwire was however smaller despite the smaller inter-bracket distance represents a sliding resistance factor.

Regarding Â the comparison of the techniques, the interactive Empower bracket have the same archwire times as they are almost overlapping with the Damon passive attacks: a little bite larger in the case of archwire 0.014 and substantially similar in case of archwire 0.016.

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EMPOWER VS DAMON

In conclusion the Empower and Damon brackets work like a passive bracket Â in the early stages and that the mild differences may be due to the different design ofÂ the bracket. In literature Pandis et al. (12) report Â an average time of aboutÂ 90 days for moderate crowding and 120 for severe cases (4) and they relate the treatment times with the crowdingÂ degree, which is the clinical situation of each subject evaluated according to the index of Little(1). The results of their study highlight an increase in treatment time of 20% for each index point generally, but with a speed of more than 2.5 in crowding Â correction for the self-ligating group, in case of moderate crowding (irregularity index < 5).

CONCLUSIONS

The timing of archwireÂ change , determined by the clinical observation of its passivation, is not standard, neither in relation to the technique (active or passive), neither in relation the diameter of the archwire chosen according to the crowding nor in relation to the dental arch.Timing is in fact variable and largely determined by the initial choice of the diameter of archwire in relation to crowding and thus from the clinically observation of the passivation of the archwire that no shows activity. In the initial phase of therapy, the choice of archwire should guarantee the minimum friction, depending on the archwire size that must be light enough to slide freely in the slot. In the initial phase of therapy, the choice of archwire should guarantee the minimum friction, that depends on the archwire size that must be light enough to slide freely in the slot. In this way, the inflammation associated with any orthodontic movementÂ remains minimal, even in case of severe crowding, so when switch to the heaviest archwire results in an increase of the same with the extension of the time required for the alignment. It is evident, therefore, that there is a lack of uniformity both in the choices made by the various authors in the literature and on the techniques, from which they arise, types, sequences and different times regarding the change of the archewires. Further studies are however desirable regarding the search for a precise method by which to determine the severity of the clinical situation, which can be precisely quantified so that it can then be associated with a specific archwire. There isnâ€™t an absolute standard and equal sequence for any case with regard to the passage to subsequent archwire, but an indicative association between a clinical situation that can be monitored at all times and the corresponding an archwire of a specific dimension. A different degree of severity of the clinical situation may thus correspond to a different archwire, so as the archwire can be used at the beginning of the treatment, is related to the initial situation of the patient.The need for a method for objectively describing the clinical situation of the patient to which to associate a specific archwire size and which represents the guiding parameter for managing the timing of alignment and leveling, it be comes necessary for the present day to exploit technologies such as CAD-CAM, with a perfect reading of the treatment phase in which the patientis located. The use of the Little irregularity index (1), as has been the case in the literature, is now questioned about its accuracy .This index is now *outdated* and not totally reliable because it is linked to the inevitabile variability of the measurement in function of the

operator, revealed by the heterogeneity of values on the measurements of the same dental arches performed by different operators in a recent study (37).This index(1), focusing only on crowding, does not take into account the other characteristic that must guide us in managing of the timing of treatment with regard to the severity of the clinical situation, i.e. leveling. Having said all this, the importance of what is the experience, expertise and eye of the clinician is clear, with respect to which no technique, however technologically advanced, or the standardization of a system, can only function. These are in fact instruments in the hands of the clinician that he can handle individually, having in mind features of the case, the variables that influence the treatment times, the mechanisms of the dental movement and the many techniques used to reduce fiction resistance. It can guide the clinicians towards selecting certain sequences of archwires rather than others in managing the treatment times.

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