

Torque delivery in the early stage of the treatment: now is possible with this innovative archwire

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Foreword:

The tooth movement is carried out for activation of a complex biological system, which starts after the delivery of light and continuous forces in a range between 6 and 250 grams. The delicate balance, mediated by the periodontal ligament, between osteoclasts that resorb bone in the compression area and balanced by osteoblasts that form new bone in the opposite area subjected to traction, determines the movement of the dental element, protecting the integrity of the alveolus. The "engine" that deliver the required force to move the tooth is, therefore, the orthodontic archwire. Its features – material, size and shape – significantly affect the biological and biomechanical effects, and the forces applied during the stages of treatment are fundamental for the effectiveness of the therapy itself.

The problem:

The current Straight-Wire prescriptions recommend an archwires sequence, in which the first archwire is always round - typically NiTi Thermal - and the force generated, activates the tooth movement mechanism, while the subsequent archwires are often rectangular. In the first stage, however, the system archwire-brackets delivers only two of the necessary information (Tip and Alignment), creating a tilt of the crowns buccally, often excessive, and reducing the level of cortical bone marginal. With the further archwires, are then transmitted on the tooth the torque values in built into the brackets.

The solution:

By placing a rectangular archwire since from the initial stage of leveling and alignment, the phenomenon of excessive flaring is reduced significantly, preserving the marginal bone and speeding the therapy due to the reduced number of clinical stages. The characteristics in terms of strength and elasticity of the archwire used, however, must be compatible to the specific therapeutic

stage: forces long lasting and very light – so not traumatic – that are able to move the crown as well as the root at one time. In the presented clinical case we have used the innovative archwire – called i-arch and engineered by SIA Orthodontic Manufacturer –, whose main features are: sizes of the two sections inverted compared to conventional archwires available on the market; very light forces (23kg), especially in the initial stage of the treatment; ease to use thanks to the reduced number of archwires for each orthodontic treatment (3 only).

In the presented case, we have considered only the upper arch that shows a moderate crowding with high canines and the group of anteriors with torque values almost correct (see. Images 1/2/3/4). We have decided to start the therapy on the upper arch only, in order to have the reference points of the occlusion with lower arch.

We used Roth 0,018" bracket and 0,016"x0,014" archwire that, as you can see, even if rectangular can be easily inserted into the brackets

Four months later the start of the therapy we found the arch aligned and leveled, with incisors in the correct position, and presumably we have also given torque to the roots of the teeth already in this primary stage. (cfr. 5/6/7/8 images)

As can be seen (see. images 3/7) there wasn't any increase of the overjet, that means we didn't have the flaring of the anteriors, which is almost normal instead when using the round archwire as first arch.

Furthermore, in this way, we eliminate all those parasites movements that we would have with the traditional approach, therefore many procedures that would have been necessary to recover the anchorage, such as Lace-back, Tie-back now are no longer necessary, simplifying the clinical protocol

Therapy start



Four Months After





The treatment will continue with the bonding of the lower arch using the same archwires sequence, below indicated:

- 1) I-Arch 0.016"×0,014" (Thermal) as the first archwire for leveling and alignment and preliminary torque delivery.
- 2) I-Arch 0.018"×0,014" (Superelastic) as the second archwire for completing the torque delivery, the form of

the arch and the sliding mechanics.

- 3) I-Arch 0.016"×0,016" (Beta Titanium) as a final archwire for complete arch form, inter-arch dynamics and the and stabilization of the results obtained.

Conclusions

I-Arch is a system of archwires that allows to obtain several clinical advantages, among which: proper biological action with application of light forces, reduction of unwished forces, reduction of treatment times.

Bibliography

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A Small gadget that makes your job easy and fast

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When we face a problem of crowding with lack of space in the arch for the eruption of a tooth, it is possible to treat it by using those mechanical proper for spaces opening. With edgewise prescription, this was achieved by manually creating complex bends on the archwire (Pict. 1). Currently, thanks to new straight wire prescriptions, these mechanics have been significantly simplified.

When, during the treatment, it is possible to apply a stainless steel 0,018" or 0,020" archwire (to balance the unwished effects of the sliding mechanics), a NiTi open spring in the archwire can be used, slightly compressed (or slightly wider than the space between the two teeth where it is inserted: it needs placing from the mesial side of the tie-wing of the distal tooth to the space to create, up to the mesial side of the tie-wing of the mesial tooth to the space to create, so that the space of the coils is reduced). The Niti shape memory allows the spring to return to its original size, to obtain the desired space in the arch.

The advantage of using such a device is given by its features, that allow tooth movement delivering a continuous and light force, with good control of its activation and with reference to while respecting the periodontal structures. Once the spring has completely delivered its force on the teeth, it will be returned to its original size. If the space still is not enough, it is possible to replace the spring, with another of greater length, so that in the insertion on the arch can be properly compressed.

Nowadays there is also an additional solution to further simplify the activation of open springs: ACTIVA – The Spring Activator®. This is a device made of metal, to be inserted on the wire in between the bracket and the spring no longer active, in order to compress it again (Pic. 2).

We have applied an ACTIVA-Spring Activator® of (2 mm) for the activation of the open springs on 2 patients. Without the need to take out the archwire and the use of a new spring, it is possible to reactivate the existing spring in a controlled manner, selecting the thickness of the activator (available in 3 sizes, 1mm/1,5mm/2mm).

ADVANTAGES:

- Chair time reduction.
- Precise control of the activation according to the therapy needs.
- Material saving due to the possibility of continuing to use the same spring.
- Easy to use.



Pic. 1: Patient in II class molar and canine. Bonded before spring insertion

Pic. 2: Spring inserted and reactivated by using ACTIVA – Spring Activator®. The space between tooth 5 and 3 has been increased in order to have the tooth 4 in place and consequently the anterior teeth.