Miniscrews – a focal point in practice

Six-part series by Dr Björn Ludwig, Dr Bettina Glasl, Dr Thomas Lietz & Prof Jörg A. Lisson – Part V

Therapeutic auxiliary elements

Down in the jungle

The number of dental suppliers worldwide that offer miniscrews has expanded from an estimated 45 and this number is still growing. Two trends are apparent from the range of products that are currently available. There are companies that supply miniscrews only in combination with the required insertion instruments. However, miniscrews are only available to an end where bone anchorage is concerned—an aspect that is far too often overlooked.

It is because if the desired therapeutic outcome is to be achieved, appropriate auxiliary devices must also be used (e.g. springs, elastic chains, wires). For the purpose of a treatment, this means that a range of suppliers must be approached in order to obtain all the elements required for the actual procedure. A potential problem under these circumstances is that the miniscrews and the auxiliary elements may be incompatible. Very few suppliers of miniscrews also offer a complete system. Such a system consists of diagnostic and therapeutic auxiliary products, in addition to miniscrews (Table 1). In the case of a complete tailored appliance from the various elements. The greater the range of auxiliary elements that is available, the more freedom and flexibility these elements afford in a range of applications.

Auxiliary elements for direct chairside use

These auxiliary elements can be divided into three main groups:

- basic elements;
- semi-finished elements; and
- finished elements.

Classification is determined by the extent to which the user has to process or manipulate the element before it can be used.

Basic elements

These consist solely of orthodontic wires (particularly wires with square profiles but also those with round profiles) of various grades and materials. The wires are used to fashion individual auxiliary elements. These can be more or less time-consuming depending on the type of appliance required. The wires (particularly those made of stainless steel) are quite reasonably priced. Round profile wires are mainly used as ligatures, in other words, simply as fixing elements, but if appropriately twisted, they can also be used for traction purposes (Fig. 1). Three-dimensional monitoring of round profile wires is not possible as they suffer little resistance to torque. Square profile wires, however, can be subjected to 3D-inspection because they are torsion free and highly stable and provide (depending on their dimensions) for a very rigid attachment between miniscrew and appliance (Fig. 2). It is advisable to use a grade of wire that fills the slot of the miniscrew.

In some cases, it may be necessary to bend a square profile wire. This can be an antagonistic mesialisation when a hook can be provided on the pin for attaching a spring or
Nature knows best.

Millions of years of evolution went into refining the protein systems that stabilise and transport calcium and phosphate essential for the growth and health of our teeth and bones. Whether it is the protein carrier systems for bone growth or enamel formation, or statherin in saliva or casein in milk, they all share a common ancestry**: evolution and natural selection have refined and perfected these systems. Cows’ milk remains the most efficient carrier of calcium and phosphate, and the specific peptide which so elegantly and efficiently transports these essential minerals is called RECALDENT™ CPP-ACP (casein phosphopeptide amorphous calcium phosphate).

No other system comes close to matching what nature has developed.
### Semi-finished elements which need to be individually adjusted

<table>
<thead>
<tr>
<th>Element</th>
<th>Device</th>
<th>Application</th>
<th>Characteristics</th>
<th>Product name</th>
<th>Available for</th>
<th>Example applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power arms</td>
<td>For Manual Retraction</td>
<td>Crimpable, can be welded on or welded to individual mini-screws. They can be used in various situations to attach the main arch or for segmental treatment.</td>
<td>Tomas® power arms Tomas® power arms Tomas® power arms</td>
<td>Tomas® pin Orthodonty Tomas® pin Orthodonty Tomas® pin Orthodonty MB, MAC, BENERT</td>
<td></td>
<td></td>
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<tr>
<td>Wire elements</td>
<td>Direct anchorage</td>
<td>Relatively easy to use with a pre-prepared wire or the orthodontic appliance</td>
<td>Tomas®-T wire OrthoEasy® Tomas®-T wire OrthoEasy® Tomas®-T wire OrthoEasy®</td>
<td>Tomas® pin Orthodonty OrthoEasy® Tomas® pin Orthodonty OrthoEasy® Tomas® pin Orthodonty OrthoEasy®</td>
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### Finished elements which can be directly used

<table>
<thead>
<tr>
<th>Element</th>
<th>Device</th>
<th>Application</th>
<th>Characteristics</th>
<th>Product name</th>
<th>Available for</th>
<th>Example applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimpable hooks</td>
<td>For use in OrthoEasy®</td>
<td>Crimpable, can be used for attaching of semi-finished elements and wires</td>
<td>Tomas®-crimp hook Power arm crimpable Tomas®-crimp hook Crimpable hook Crimpable hook</td>
<td>Tomas®-crimp hook OrthoEasy® Tomas®-crimp hook OrthoEasy® Tomas®-crimp hook OrthoEasy®</td>
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<tr>
<td>Compression springs</td>
<td>Orthodontic, mesialisation</td>
<td>Superalloy NiTi compression springs</td>
<td>Tomas®-compression spring Compression springs OrthoEasy® OrthoEasy®</td>
<td>Tomas®-compression spring OrthoEasy® Tomas®-compression spring OrthoEasy® Tomas®-compression spring OrthoEasy®</td>
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<tr>
<td>Coil springs</td>
<td>Distalisation, OrthoEasy®</td>
<td>Superalloy NiTi coil springs with preformed bends fit into pin head</td>
<td>Tomas®-coil spring Tomas®-coil spring Tomas®-coil spring Tomas®-coil spring</td>
<td>Tomas®-coil spring OrthoEasy® Tomas®-coil spring OrthoEasy® Tomas®- coil spring OrthoEasy® Tomas®-coil spring OrthoEasy®</td>
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<tr>
<td>Hook for elastics, crozier or springs</td>
<td>Distalisation, OrthoEasy®</td>
<td>Hook compatible with OrthoEasy® for secure distalisation of croziers and springs</td>
<td>Tomas®-hook for elastics Tomas®-hook for elastics Tomas®-hook for elastics Tomas®-hook for elastics</td>
<td>Tomas®-hook for elastics OrthoEasy® Tomas®-hook for elastics OrthoEasy® Tomas®-hook for elastics OrthoEasy® Tomas®-hook for elastics OrthoEasy®</td>
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<tr>
<td>Sliding hooks</td>
<td>Distalisation, OrthoEasy®</td>
<td>Square tube with extension arms for attachment of elastic elements, croziers and springs</td>
<td>Power arm sliding hook OrthoEasy® Power arm sliding hook OrthoEasy® Power arm sliding hook OrthoEasy® Power arm sliding hook OrthoEasy®</td>
<td>Tomas®-power arm sliding hook OrthoEasy® Tomas®-power arm sliding hook OrthoEasy® Tomas®-power arm sliding hook OrthoEasy® Tomas®-power arm sliding hook OrthoEasy®</td>
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**Table 2**

(Graphics: DENTAURUM, FORESTADENT; Layout: DTI)

<table>
<thead>
<tr>
<th>Element</th>
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<th>Characteristics</th>
<th>Product name</th>
<th>Available for</th>
<th>Example applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sliding bar</td>
<td>Distalisation, OrthoEasy®</td>
<td>Square tube with option for croziers and springs</td>
<td>Tomas®-power arm OrthoEasy® Tomas®-power arm OrthoEasy® Tomas®-power arm OrthoEasy® Tomas®-power arm OrthoEasy®</td>
<td>Tomas®-power arm OrthoEasy® Tomas®-power arm OrthoEasy® Tomas®-power arm OrthoEasy® Tomas®-power arm OrthoEasy®</td>
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**Table 1**

(Graphics: DENTAURUM, FORESTADENT; Layout: DTI)
The revolution is about to come:
Caries Infiltration – The innovative treatment method without drilling!

DMG. A smile ahead.
www.drilling-no-thanks.com
info@drilling-no-thanks.com
Elastic chains are widely used traction elements. In contrast with NiTi springs, however, these rapidly lose their effectiveness. For this reason, a chain is only placed around the head of a miniscrew so that it can be more easily removed later. Depending on head design and the direction of the force applied, it is possible for the chain to become accidentally dislodged from the screw head. This problem can be avoided by the use of ready-made hooks (Table 5) that can be attached to the head of the screw.

**Sliding hooks**

Sliding hooks with a welded arm for attaching springs (Table 5) are an equally familiar piece of equipment. They are experiencing something of a renaissance in connection with the use of miniscrews. They are used for En Mass Retraction, mesialisation and distalisation. The effect of a sliding hook is determined by many different factors, which is why the value of attaching sliding hooks to the arch is disputed.

**Auxiliary elements for laboratory use**

All the elements discussed above can be prepared and inserted, with varying amounts of time expenditure, directly at the chairside. In recent years, the range of applications for miniscrews has also been extended to skeletal adjustment treatments, such as palatal suture expansion (see Dental Tribune Asia Pacific 5(2009):4). The corresponding appliances require very careful preparation, and for this reason, the related tasks have been transferred to the laboratory. The principal procedure involves the insertion of the miniscrew(s) and the subsequent reshaping process. Once a working model has been prepared, the appliance is constructed and adjusted appropriately. For connection to a miniscrew, a suitable abutment must be employed. In hybrid PNL for example, two arms of the expansion screw are welded to the abutment. The laboratory abutments available from FORESTADENT fit the head of the OrthoEasy screw. An adhesive is used for fixture after insertion.

An innovative approach is the BENEFIT-System (Mondeal). Analogous to prosthetic implants, an implant is placed in the bone. Instead of the widely known system where the head is firmly bonded to the thread, there are different abutments (Table 5) available. These will be threaded to the bone screw. The laboratory abutments available from FORESTADENT fit the head of the OrthoEasy screw. An adhesive is used for fixture after insertion.

**Conclusion**

Depending on the task at hand, it may be necessary to use various auxiliary elements. Most of the connection elements discussed are new and have already been used successfully in orthodontic treatment for some time. For this reason, most of them will already be available in every practice, but often not where they should be. In order to be effective and not waste time searching for tools, it is advisable to have the most important auxiliary elements hand in hand in a tray. You can either create a DT version of the tray or purchase one of the ready-made trays available on the market.