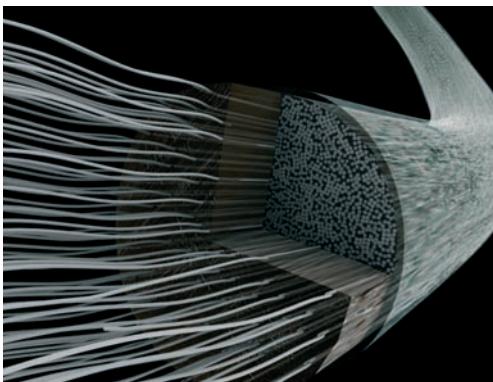


www.sticktech.com

everStick®A&O

everStick®ORTHO



everStick® fibre reinforcements in orthodontics

- Reliable anchorage
- Aesthetic retention





everStick®A&O – reliable anchorage



everStick®ORTHO – aesthetic retention

- aesthetic and comfortable for the patient
 - » completely metal free
- a quick and easy application
 - » adaptable and bondable directly to the teeth
 - » no pre-bending and exact positioning necessary
- rigid orthodontic anchorages
 - » polymerised FRC is even more rigid than metal wire*
 - » greater attachment surface area when compared with conventional orthodontic brackets. This increases the rigidity of the unit
- can be applied buccally / labially and lingually
- easily modified – can be combined with fixed appliances
 - » hooks and brackets can be added later if needed

* Francesca Sfondrini et al. Fiber reinforced composites (FRCs) and orthodontic stainless steel wires: comparison of mechanical properties by means of three-point bending test. Societa Italiana Di Ortodonzia, XVII SIDO International Congress, October 1-4, 2003, Rimini, Italy

- aesthetic – blends with the natural tooth shade therefore offering maximum aesthetics
- quick application – no need to pre-bend before placement
- easy to adapt directly to the teeth – no study models nor second visit needed
- reliable composite adhesive bonding
- completely metal free
 - comfortable to wear
 - no risk of allergy to those patients sensitive to Ni or Cr

Form	Unidirectional fibre bundle
Diameter	everStick®A&O: Ø 1.2mm everStick®ORTHO: Ø 0.75 mm
Fibre type and diameter of one fibre	E-glass, 15 µm
Amount of fibres	everStick®A&O:2000. everStick®ORTHO: 1000

The advantages of fibre reinforced composites (FRC)

Glass fibre composites offer a modern alternative material to be used in orthodontics with a number of clinical benefits. In orthodontics, fibre reinforced composites, can be used as a splinting material both in the active (anchorage) and in passive (retainers) treatment phases.

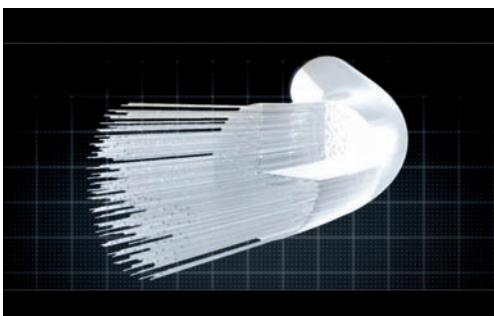
Orthodontic anchorage units made with FRC can be part of a conventional orthodontic treatment plan with brackets and wires. However, conventional appliances can partly be replaced by FRC anchorage units in certain cases.

The possible uses of everStick fibres are many due to their composite impregnated composition and biocompatibility. The fibre reinforcement anchorage units and appliances can be easily fabricated either in the mouth, extra-orally on a silicone model or ordered from the dental laboratory. The unique structure of everStick fibres guarantees a strong and reliable bonding using conventional composite materials already used in orthodontics.

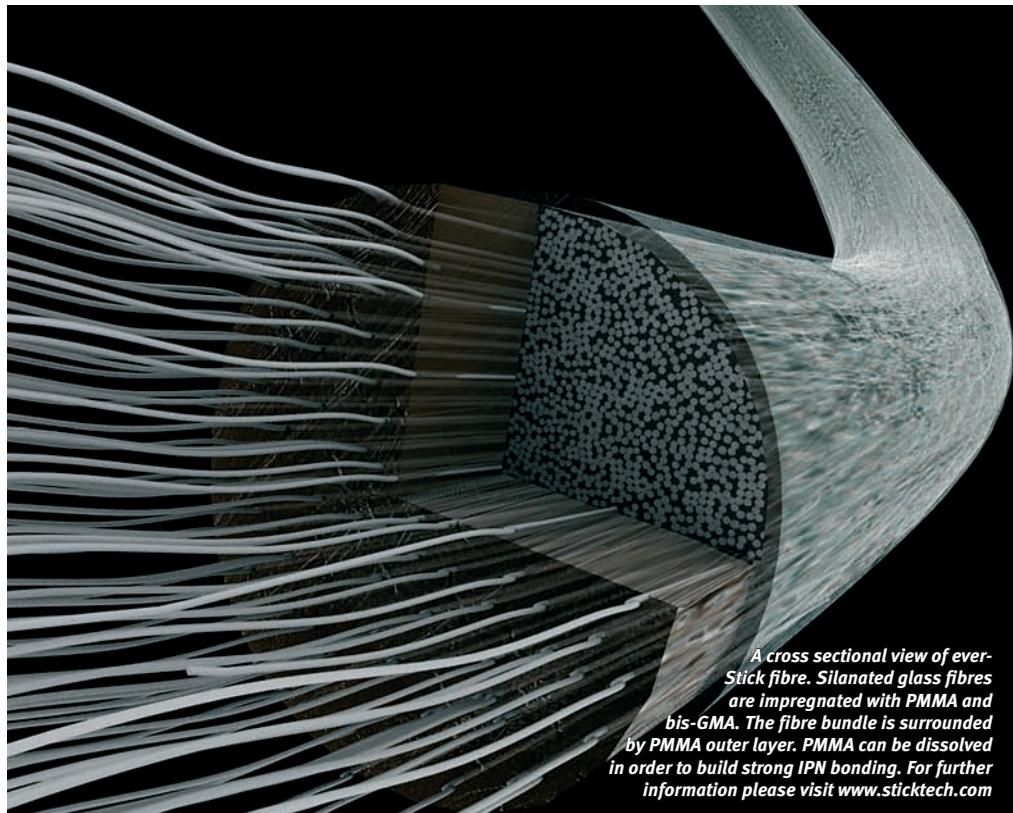
Now, the patient can be provided with a natural looking retainer or anchorage unit. FRC retainers and anchorage units are totally metal free, which provides maximum aesthetics and advantages to those allergic to Nickel or Chrome.



Inside everStick fibre. Individual fibres, bis-GMA and PMMA

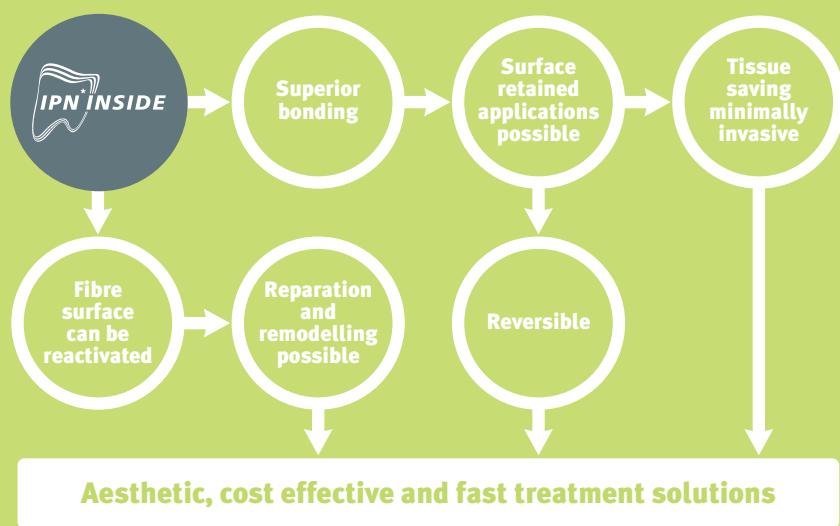


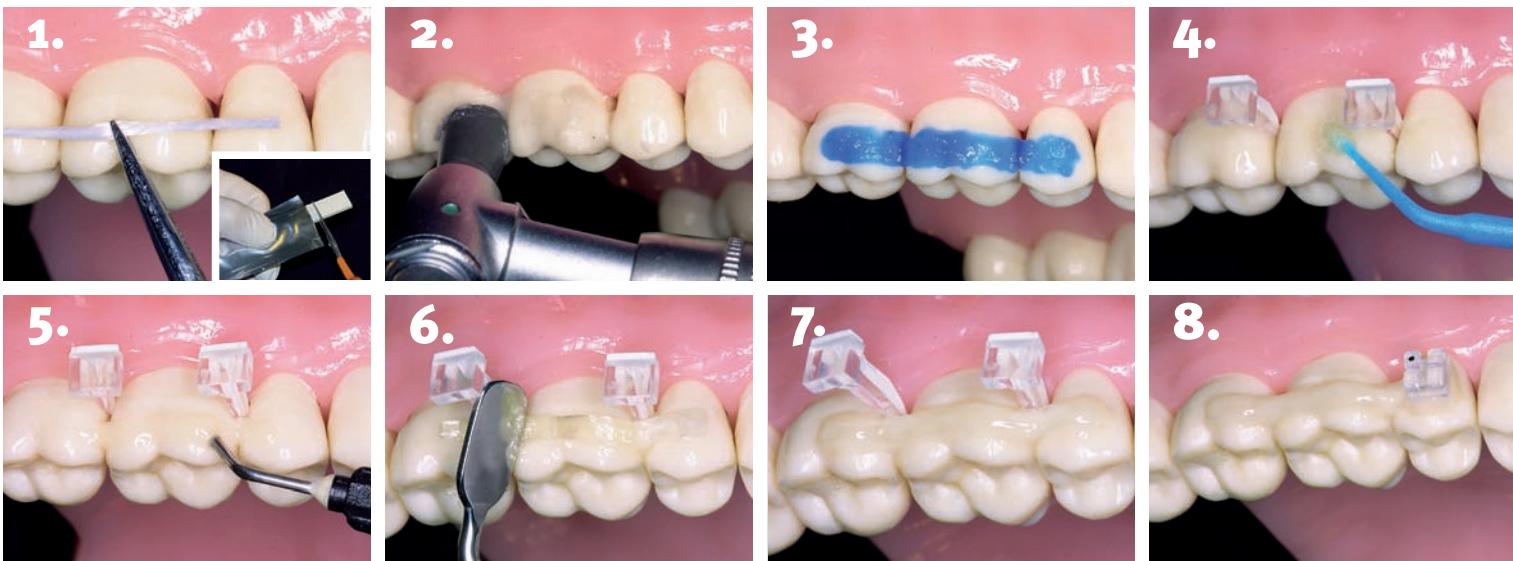
A cross sectional view of everStick fibre after light curing.



A cross sectional view of ever-Stick fibre. Silanated glass fibres are impregnated with PMMA and bis-GMA. The fibre bundle is surrounded by PMMA outer layer. PMMA can be dissolved in order to build strong IPN bonding. For further information please visit www.sticktech.com

IPN* The heart of everStick® fibres





How to build a reliable anchorage with everStick®A&O

1. Measure the appropriate length of everStick®A&O using dental floss. Open the foil pouch and slide out the silicone sleeve containing the fibre bundle. Place the measuring floss on the sleeve. Cut the desired length of fibre bundle and silicone packing sleeve with sharp scissors. Protect the cut fibre bundle piece from exposure to light, e.g. under a light shield.

2. Clean the area to be bonded on the teeth with pumice and water. Air-dry the teeth surfaces after cleaning. Instead of using pumice and water, you can microetch each tooth with aluminium oxide for 5 seconds, in order to increase the bond strength. After microetching, rinse with water and air-dry the bonding surfaces on the teeth.

3. Etch the bonding surfaces of the teeth with ortho-phosphoric acid. The etched area should be large enough for the full length of the fibre bundle and overlying composite. Interproximal spaces should be etched too and the etching time should be long enough (approx. 45–60 seconds). After etching, rinse and dry the tooth surfaces. Keep the area dry before applying adhesive resin.

4. Place transparent wedges into the interproximal spaces to maintain good access for cleaning. Apply bonding agent (sealant) over the whole area the anchorage unit will be bonded to. Light cure as the bonding material manufacturer recommends.

5. Apply a continuous, thin layer (0,5 mm) of flowable composite, e.g. Stick™ Flow onto the surfaces of the teeth in the intended area for the anchorage unit, also the interproximal areas. Be careful not to fill the whole interproximal area with composite material, in order to maintain a good space for cleaning. Do not light cure the composite layer at this point.

6. Remove the white paper cover from the silicone, lift out the everStick®A&O fibre bundle from the groove with tweezers. Adapt one end of the fibre bundle into the flowable composite, by pressing it down with a hand instrument or using the special silicone instrument (Refix D). Light cure this end for 5–10 seconds, but protect the rest of the fibre bundle from the curing light with a wide instrument e.g. a Stick Stepper. Continue curing the rest of the fibre bundle either a tooth at a time by pressing it down with a hand instrument or silicone instrument. Light cure for only 5–10 seconds on each tooth at this point. Try to keep the fibre bundle round. Do not press and contour the everStick®A&O fibre bundle into the embrasures too near the gingiva to permit good oral hygiene.

7. After the whole fibre bundle has been positioned and initially cured, cover it with a layer of composite and make sure it is totally enclosed. Then light cure for 40 seconds on each tooth. Leave an opening at the embrasure for good hygiene, but be careful not to cut the transparent fibre bundle when finishing and polishing the composite.

8. Brackets, tubes or hooks must be bonded to the anchorage unit either at the same time as the whole anchorage is light cured (see above) or separately. In case brackets, tubes and hooks are bonded on to the polymerized anchorage, the surface of the anchorage needs to be roughened with a diamond burr. Brackets, tubes or hooks should be bonded on to the anchorage as recommended by the manufacturer. When metal brackets, tubes and hooks are used sandblasting and silanization is recommended for the bonding surface. After final polymerization and finishing the FRC anchorage unit can be used for performing the desired tooth movements.

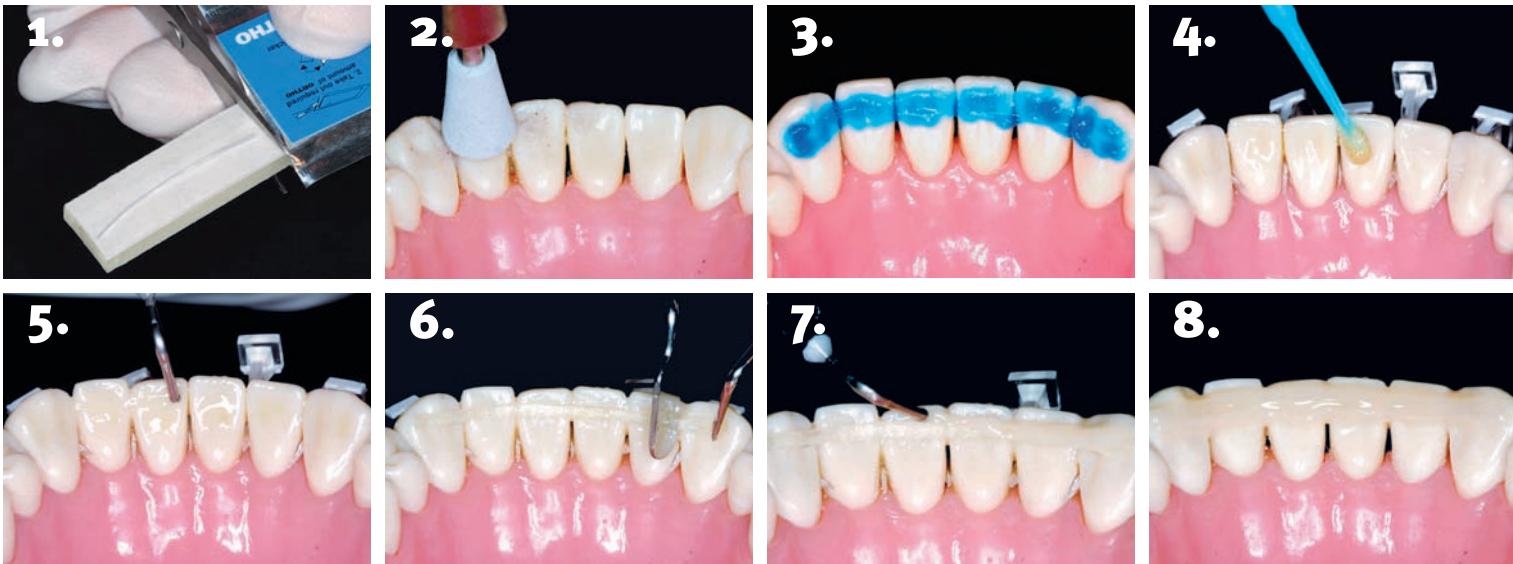
CLINICAL TIPS

- The use of powder free gloves is recommended with everStick-fibres.
- The use of Rubber dam is recommended with everStick.
- Adapt and bond the anchorage units to the teeth for their full length.
- Cover the whole anchorage and interproximal areas with flowable composite. Placement of “spots” of composite does not produce a reliable bond.

- Interproximal spaces should be shaped to facilitate good oral hygiene, e.g. with Interproximal brushes.
- If necessary flatten the fibre bundle to get large enough bonding area for tubes, brackets or hooks.
- When stronger fibre anchorage is needed, two or more fibre bundles may be used.
- If the fibre anchorage is bonded to the material other than natural tooth please follow the specific bonding procedure for

each material.

- everStick®A&O should be used clinically with care and the patient should be warned not to abrade the outer surface of the anchorage in order to avoid exposure of the fibres, which may cause irritation.
- Removal of the anchorage unit can be done by grinding or by peeling the unit from the tooth surface.
- Store the package in the refrigerator (2–8°C, 35–46 °F) when not in use.



How to make an aesthetic orthodontic retention with everStick®ORTHO

1. Measure the appropriate length of everStick®ORTHO – using dental floss. Open the foil pouch and slide partly out the silicone sleeve containing the fibre bundle. Cut the desired length of the fibre bundle and silicone packing sleeve with sharp scissors. Protect the cut fibre bundle piece from exposure light. Fold and reseal the foil pouch.

2. Clean the area to be bonded on the teeth with pumice and water. Air-dry the teeth surfaces after cleaning. Instead of using pumice and water, you can microetch each tooth with aluminium oxide for 5 seconds, in order to increase the bond strength. After microetching, rinse with water and air-dry the bonding surfaces on the teeth.

(If possible place transparent wedges into the interproximal spaces to maintain good access for cleaning.)

3. Etch the bonding surfaces of the teeth with ortho-phosphoric acid. The etched area should be large enough for the full length of the fibre bundle and overlying composite. Interproximal spaces should be etched too and the etching time should be long enough (approx. 45–60 seconds). After etching, rinse and dry the tooth surfaces. Keep the area dry before applying adhesive resin.

4. Apply bonding agent (sealant) over the whole area the retainer will be bonded. Light cure as the bonding material manufacturer recommends.

5. Apply a continuous, thin layer (0,5 mm) of flowable composite, e.g. Stick™ Flow onto the surfaces of the teeth in the intended area for the retainer, also the interproximal areas. Do not light cure the composite

layer at this point. Remove the white paper cover from the silicone, lift out the everStickORTHO fibre bundle from the groove with tweezers.

6. The retainer should be placed on the lingual surface as close to the incisal edges of the teeth as possible while taking the occlusion into consideration. Adapt one end of the fibre bundle into the flowable composite, by pressing it down with a hand instrument or using the special silicone instrument (Refix D). Light cure this end for 5–10 seconds, but protect the rest of the fibre bundle from the curing light with a wide instrument e.g. a Stick® Stepper.

7. Continue curing the rest of the fibre bundle a tooth at a time by pressing it down with a hand instrument. You can also place the whole retainer in a single step by using the silicone transfer instrument to carry and then hold the fibre against the tooth.

Pressure to hold the fibre against the tooth is via the Stepper instrument.

Light cure for only 5–10 seconds on each tooth at this point. Try to keep the fibre bundle round. Do not press and contour the fibre bundle into the embrasures too near the gingiva to allow good oral hygiene. After the whole fibre bundle has been positioned and initially cured, cover it with a layer of composite and make sure it is totally enclosed. Then light cure for 40 seconds on each tooth.

8. Leave an opening at the embrasure for good hygiene, but be careful not to cut the transparent fibre bundle when finishing and polishing the composite.

CLINICAL TIPS

- The use of powder free gloves is recommended with everStick fibres.
- The use of Rubber dam is recommended with everStick.
- Place the fibre retainer as close to the incisal edge as possible in order to have optimal retention.
- Adapt and bond the retainer units to the teeth for their full length, including interproximal spaces. Spot bonding (placement

- of composite in discrete spots) does not produce a reliable bond.
- Good Interproximal access for cleaning can be created by not filling the whole interproximal area with composite material. The use of interproximal wedges will facilitate this.
- When applying a retainer on a palatal or buccal surface, the occlusion must be checked to ensure that the fibre bundle is not placed in occlusion.

- everStick®ORTHO should be used clinically with care and the patient should be warned not to abrade the outer surface of the retainer in order to avoid exposure of the fibres which may cause irritation.
- Removal of the retainer can be done by grinding or by peeling the unit from the tooth surface.
- Store the package in the refrigerator (2–8°C, 35–46 °F) when not in use.



Maxillary and mandibular bonded retainers after orthodontic therapy using everStick®ORTHO

By courtesy of Vittorio Cacciafesta, DDS, MSc, PhD, Italy & M. Francesca Sfondrini, MD, DDS, Italy

1–4. The patient was a 13-year-old female who was referred to our clinic for maxillary and mandibular crowding and increased overjet. She had fixed orthodontic therapy, that lasted 1 year and 5 months. After complete correction of the crowding and reduction of overjet, it was planned to place maxillary and mandibular bonded retainers made of everStick®ORTHO to prevent any possible relapse of crowding.

5–6. With the help of a metallic ligature placed on the front teeth of the maxillary model, the desired length of fibre splint was measured and cut with scissors directly from the package. The lingual surfaces of the teeth were sandblasted with a microetcher 3 seconds per each tooth. After sandblasting, the tooth surfaces were etched with 37% phosphoric acid for 30 seconds. Note that etching was performed on a wide enamel area, to optimize bond strength.

7–8. After proper rinsing and drying, the enamel surface should have a white chalky appearance. After etching, the bonding agent was applied with a brush and cured.

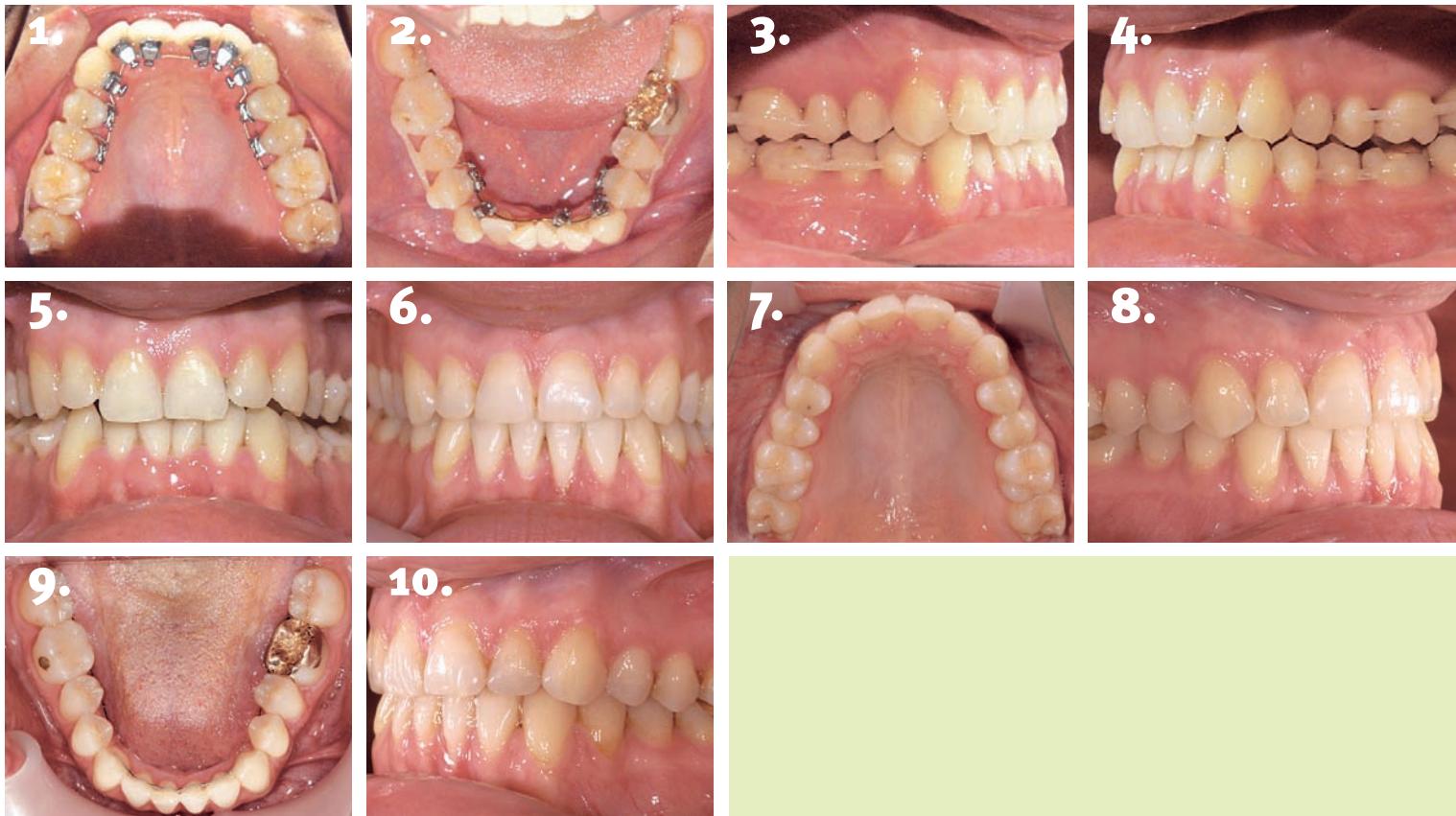
9. A thin layer of flowable composite was applied onto the lingual surfaces. Note that the flowable composite should also cover the interproximal spaces and should not be cured at this time.

10. The fibre bundle was then placed onto the flowable composite and pressed down with a hand instrument.

11. Each tooth was light cured for 5 seconds, protecting the rest of the fibre bundle with a wide instrument. Then, the whole retainer was covered with a layer of flowable composite and light cured for 40 seconds per tooth. Note that the flowable composite must cover the entire length of the fibre bundle, also in the interproximal areas.

12–14. The retainer was polished, and the occlusion was checked to ensure that the fibre bundle was not placed in occlusion. The same procedure was carried out in the lower arch for fabricating a bonded 3-3 mandibular retainer.

15–16. Final posttreatment result.



FRC applications in active orthodontic treatment

By courtesy of Professor Dietmar Segner and Dr Dagmar Ibe, Hamburg, Germany

1–2. The 36 years old female patient needed a fixed orthodontic appliance in the anterior region. She showed a nearly perfect Angle Class I occlusion in the lateral segments, but both the upper and lower anterior regions were in a retroclined position and showed significant irregularities and rotations. For aesthetic reasons the patient chose a lingual appliance. For the active movement of the malpositioned teeth, brackets were only required from the second premolar to the second premolar in the upper jaw and from the first premolar to the first premolar in the lower jaw. The remaining teeth were in the correct position but were necessary as anchorage. To use these teeth for anchorage and to avoid any discontinuities in the dental arch at the end of the archwire it was decided to use everStick fibre anchorages on the buccal sides of both jaws.

3–4. In the upper jaw the anchorages extended from the 2nd premolar to the 2nd molar and in the lower arch from the 1st premolar to the 1st molar. everStick fibre anchorages were bonded directly to etched enamel surfaces with bonding agents. A thin layer of flowable composite (Kanisit, Kaniedenta, Herford, Germany) was applied prior placing the fibre bundle (Fig 3,4) and the fibres were coated with the composite prior to placing them in the mouth.

5. After light curing the fibre anchorages for a few seconds, another layer of the composite was added

on top of the anchorage. After this the fibre structure was light cured thoroughly. Benefits of fibre anchorages: Without compromising aesthetics the patient had increased comfort and less cost, while the orthodontist had less problems with accessibility of the molar lingual brackets. Also, fibre anchorages are more aesthetic on the buccal side of the teeth and more comfortable for the patient than buccal or lingual brackets (Fig 5). By using fibre anchorages the significant cost of placing eight lingual brackets and the corresponding set-up procedure could be saved. In addition, the patient's comfort was improved significantly as lingual brackets in molar segments are often associated with tongue irritations.

6–10. The appliances were removed after 13 months of treatment. The treatment goals were achieved with as little aesthetic and comfort impairment as possible. Another advantage of using everStick fibre stabilization bars in the lateral segments was that it would have been difficult to bond a lingual bracket on tooth 36 because of the gold restoration.

The interdental spaces were not filled with fibre material in order to make the dental hygiene as easy for the patient as possible. Retention will be done with a fixed retainer (wire) for approximately a year. Then Essix-type appliances will be used as retainers due to the patient's preference.

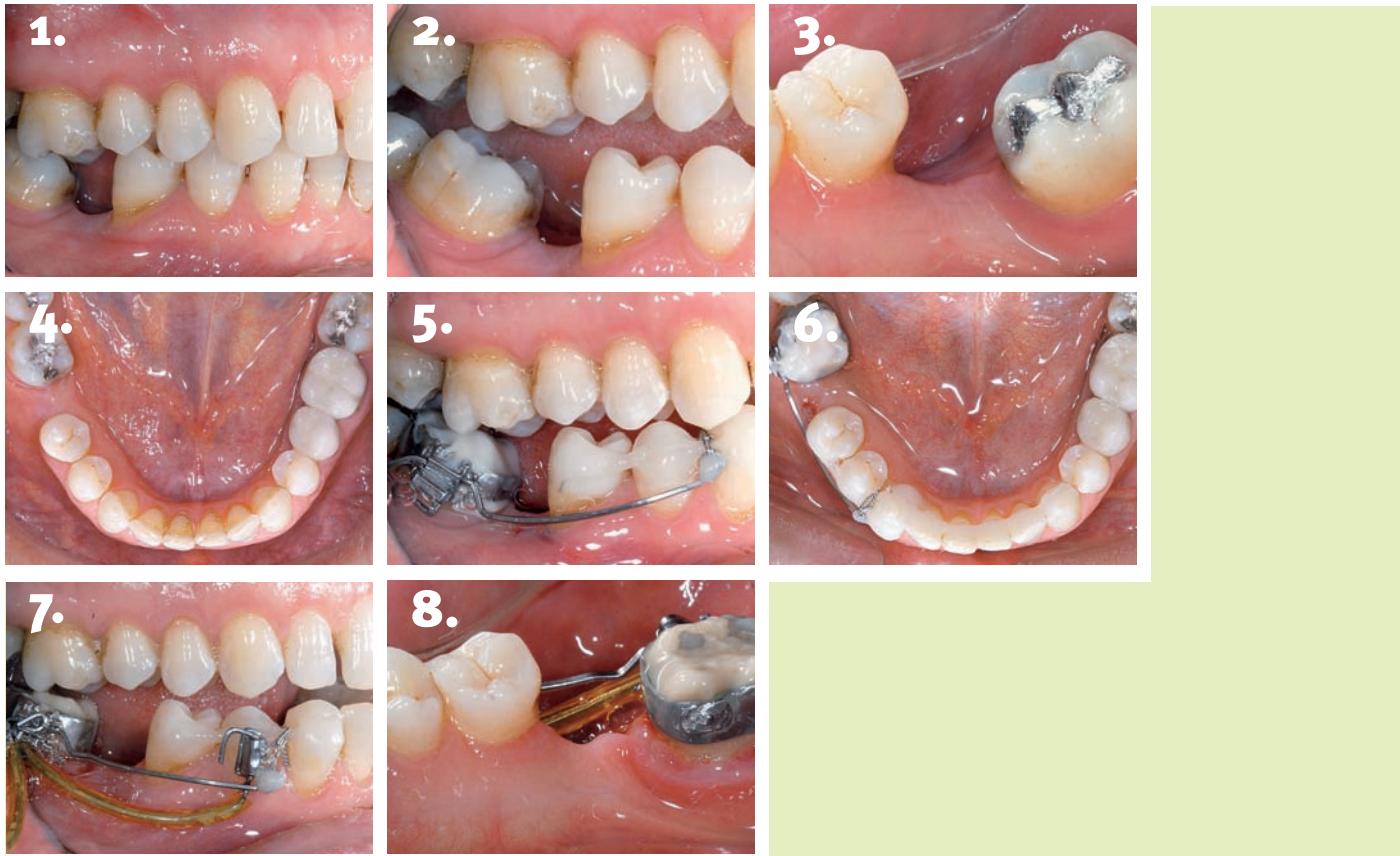


Stick Tech Ltd

Stick Tech Ltd is a Finnish technology focused company dedicated to the advancement of dentistry. We manufacture fibre reinforced composites to meet demanding dental requirements. Stick Tech Ltd has developed a fibre reinforcement technology that enables the use of completely new treatment methods in dentistry. Patented Stick® and everStick® products are used by dentists and dental technicians worldwide.



Stick Tech Ltd
P.O. Box 114, FI-20521 Turku, Finland. Tel. +358 2 4808 2500, www.sticktech.com



The use of everStick®A&O as anchorage reinforcement for orthodontic molar uprightness

By courtesy of Vittorio Cacciafesta, DDS, MSc, PhD, Italy
M. Francesca Sfondrini, MD, DDS, PhD, Italy

1–4. A 45-year-old female visited our clinic for a dental examination. The occlusion was acceptable, however the patient was missing the mandibular right 1st molar that had been previously extracted. She wished to have that tooth replaced with an implant, however there was no space available in the arch, and the 2nd and 3rd molars were mesially inclined. Therefore, the treatment plan was to correct orthodontically the severe mesial inclination of the mandibular right 2nd and 3rd molars before implant surgery.

5–6. As the patient was very concerned about the esthetic appearance of the orthodontic appliance, it was decided to cement only one band on the 2nd molar and use a .019" x .025" TMA cantilever to upright the tooth. Anchorage was reinforced on the remaining teeth by means of a long glass fiber-reinforced composite (everStick® A&O, Stick Tech Ltd.) bonded on the lingual side from canine to canine, and on the labial side from 2nd premolar to right canine. The TMA cantilever was directly ligated to the labial FRC by means of a stainless steel ligature.

7–8. After 3 months of treatment, a second TMA cantilever was added to control the vertical movement of the 2nd molar. Result after 7 months of orthodontic therapy: please note the good uprightness of the 2nd molar and its excellent vertical control.



An unusual solution to a restorative problem: Fibre reinforced composites combined with 2D Orthodontic Brackets

By courtesy of Ian Hutchinson, BDS FDS RCSEd M.Orh MSc, England

1. A 63 year old female presented to the practice complaining about the appearance of her upper front teeth. The patient reported having a two-wing resin retained bridge, to replace the missing upper right central incisor, placed many years ago.

Recently the bridge failed and she returned to her General Dental Practitioner for re-cementation. At the time she complained about the appearance of a gap between the pontic and the upper left central incisor. The gap had been slowly increasing over the years.

2. The GDP re-cemented the bridge. The space was a result of the wing on the upper left central incisor failing some time ago and the tooth drifting distally. The restorative solution to the problem to the space was either a new bridge or implant. However, this would result in the prosthetic tooth having an increased mesio-distal width to close the space.

An orthodontic solution was proposed. The aim of treatment was to move the upper left central incisor to its original position. The patient refused to wear a conventional labial fixed appliance.

3. The treatment comprised of the removal of the wing bonded to the upper left central incisor. An anchorage unit was created by joining the upper left lateral incisor, canine and premolar with fibre reinforcement, everStick®ORTHO (Stick Tech Ltd Finland).

4-5. The active component was created from two 2D Orthodontic Lingual brackets bonded to the upper left lateral and central incisor. A 0.012 Nickel titanium wire was used.

8 weeks later, the upper left central incisor has aligned. The patient is delighted with the result. The appliance is to be left in situ for 6 months for retention.

Conclusion:

everStick fibre reinforced composite resin enables the clinician to create an anchorage unit for orthodontic treatment without the need for conventional brackets. The technique is aesthetic, comfortable to the patient and enables tooth movement to commence immediately when compared to the conventional method of levelling and aligning with fixed appliances prior to placement of a rigid anchorage archwire.