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INTRODUCTION

Angelus - a pioneer company and specialist in research, development and manufacture of fiberglass products for dentistry - has launched a new generation of fiber posts.

The development of this new technology was the result of an comprehensively and thoroughly study of current fiber posts techniques deficiencies and difficulties in their use.

The first challenge was to reduce the drill and posts shapes and sizes offering a dynamic size that fits in different canals’ morphology.

The second was to develop a system that fits properly to the cervical morphology, an area that normally presents more amplitude. The use of traditional posts results in a lack of adaptation in this area, which may cause post failure.

As result, Angelus has developed a universal system called SPLENDOR-SAP (Single Adjustable Post), consisting of only one drill, one post and one sleeve. This solves the first challenge by decreasing the inventory of various drills and posts sizes. By adapting to narrow or medium-sized canals and filling the cervical area of the preparation with fibers, the second challenge was also solved.

Additionally, SPLENDOR - SAP allows minimally invasive preparations, as well as provides greater mechanical interlock, increasing the retention between the post and canal walls in addition to the chemical bonding.

SPLENDOR - SAP, patent granted and registered by Angelus, inaugurates a new era of smart posts, since it follows two trends in dentistry: simplification, by the use of a single adjustable post, meaning a universal size for narrow, medium or wide channels; and minimally invasive approach, as it allows the adjustment of the “post to the canal and not the canal to the post”, which results in the absence or minimal removal of the dental structure avoiding to decrease root structure resistance.
PRESENTATION

- REF. 6254 SPLENDOR - SAP - Pack with 5 sleeves + 5 posts + 1 bur
- REF. 6258 SPLENDOR - SAP - Pack with 5 sleeves + 5 posts (refill for Splendor SAP use only)
INDICATION

Core build-up for restorative procedures

TECHNIQUE GUIDE

Important note: rubber dam isolation is recommended to proceed the post space preparation and post placement

A. Post space preparation

1. Partially remove the canal obturation to the desired level, leaving 3 to 5 mm obturation at the apical third.
2. Prepare the post space using Splendor bur;
3. Verify radiographically the post prep and the remaining obturation.
B. Post preparation

1. Place SPLENDOR-SAP post in the canal.

2. Insert the sleeve onto the post and position it as tightly as possible with light pressure. Record the sleeve length according to the post marks.

3. Verify occlusion space. Cut the post and sleeve set at the defined length.

4. Remove the set.

5. Wipe them separately with alcohol and air jets.

6. Apply adhesive to the post and sleeve according to the preferred product instructions.

C. Post placement

1. Wash the post space preparation with water and dry with paper points.

2. Etch. Use a bonding system that is compatible with dual-cure cements. Apply according to the manufacturer's instructions.

3. Apply cement inside the SPLENDOR-SAP sleeve and on the post surface. Inject cement into the canal. Start injecting at the bottom of the canal space preparation while progressing upwards.

4. Immediately insert SPLENDOR-SAP post and the sleeve over it.
5. Remove excess cement. Light cure. Proceed core build-up.

**IMPORTANT**: Zinc phosphate and glass ionomer cements (conventional and resin modified) can also be used, but their mechanical properties are lower than those of resin cement. Self-adhesive cements do not require acid etch and adhesive application.

**D. Core build-up**

1. Build-up the core with composite.

**Technique guide video**

Scan and access our instruction video on Youtube channel.
COMPOSITION

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST AND SLEEVE</td>
<td></td>
</tr>
<tr>
<td>Fiberglass</td>
<td>80%</td>
</tr>
<tr>
<td>Epoxy Resin</td>
<td>20%</td>
</tr>
<tr>
<td>BUR</td>
<td></td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>100%</td>
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</table>

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Radiopacity</td>
<td>5-7 mm Al</td>
</tr>
<tr>
<td>Flexural Strength</td>
<td>≥ 1200 MPa</td>
</tr>
<tr>
<td>Elastic Modulus</td>
<td>50 GPa</td>
</tr>
<tr>
<td>Sleeve taper</td>
<td>0,08 mm/mm</td>
</tr>
</tbody>
</table>
# MEASUREMENTS

<table>
<thead>
<tr>
<th></th>
<th>Length Total (mm)</th>
<th>ø Ápex (mm)</th>
<th>ø Body (mm)</th>
<th>ø Top (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>18,0</td>
<td>0,65</td>
<td>1,0</td>
<td>1,0</td>
</tr>
<tr>
<td>Sleeve</td>
<td>12,0</td>
<td>1,4</td>
<td>-</td>
<td>2,4</td>
</tr>
</tbody>
</table>

[Diagram of Post and Sleeve dimensions]
FEATURES

1. **Universal**
   - Single size for narrow, medium and wide canals

2. **Anatomical**
   - Adjustable to the shape of the canal

3. **Increased Retention**
   - Mechanical interlock in addition to the chemical bonding

4. **Minimally Invasive**
   - Does not require major canal enlargements

5. **Low risk of root fracture**
   - Elastic modulus close to dentin
1. **Universal**

A single system to be used in different canal's morphologies: narrow, medium or wide.

simplify your inventory without various posts and drills sizes.
2. Anatomical

**Adjustable to root canal** - The system promotes great adaptation to the canal diameter and taper.

**Adaptable to cervical region** - The sleeve promotes a greater amount of fibers in the cervical region, allowing a smaller volume of cement and, consequently, greater resistance and retention to the post.

**Sleeve in oval shape** - The sleeve shape adapts the oval anatomy of most root canals increasing the contact between the post and canal walls.

**Sleeve lateral opening** - Allows the excess cement to flow from canal to the cervical space.

3. Increased retention

**SPLENDOR-SAP’s exclusive design** enables mechanical retention of the sleeve within the canal.

Positioning the sleeve with the post fills the canal, increasing retention, minimizing risks of displacement.

4. Minimally Invasive Preps

SPLENDOR - SAP can be used in canals with their original anatomical shape*, not requiring additional preparation. Follows the concept of “the post being adapted to the space not creating space to the post”

*Except in cases of atresic canals (less than 1,0 mm diameter).
5. Low risk of root fracture

The fiberglass composition of SPLENDOR - SAP provides an elastic modulus close to dentin, minimizing risks of root fracture.

**Elasticity Modulus (GPa)**

<table>
<thead>
<tr>
<th>Material</th>
<th>Elasticity Modulus (GPa)</th>
</tr>
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<tbody>
<tr>
<td>Dentin</td>
<td>18.3</td>
</tr>
<tr>
<td>Glass Fiber</td>
<td>40</td>
</tr>
<tr>
<td>Ceramics</td>
<td>170</td>
</tr>
<tr>
<td>Metal</td>
<td>180</td>
</tr>
</tbody>
</table>
TESTS

*Flexural resistance*

**Methods:**

Methods and methodology of the tests were based on ISO 14125 – Fiber-reinforced plastic Composites – Determination of flexural properties. Posts were tested with a pre-determined advance of 2 mm/min, within 12mm space from the base and 5% pre-load force before starting.

<table>
<thead>
<tr>
<th></th>
<th>Max Load (N)</th>
<th>Flexural Limit (MPa)</th>
<th>Deformation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Av. Value</strong></td>
<td>52.07*</td>
<td>1200</td>
<td>92.12</td>
</tr>
</tbody>
</table>

*The use of the sleeve increases the maximum post separation force by 3x.*
Flexural resistance comparison (Angelus posts)

*The use of the sleeve increases the maximum post separation force by 3x.*
Radiopacity

The sample was placed on the digital x-ray sensor, together with a 99% aluminum gauge (1100 alloy), which thickness varies from 1 to 11 mm with regular and uniform 1/1 mm increments. X-ray exposure was 65 kVp and 10 mA radiation. The distance from the x-ray to the sample was 400 mm and the inherent radius filtration was 2.5 mm. The exposure time was 0.8 seconds.

Figure 1 - Sample radiopacity compared with the Al gauge.

Figure 2 - X-ray image of the post and sleeve.
Glass fibers distribution (within the epoxy resin matrix)

Methods
A bench microscope was used for the glass fiber distribution within the resin matrix analysis. A cross section cut was made and the face to be analyzed was polished to better observe the fiber distribution.

Result
Fibers are distributed in a homogeneous aspect and the amount of fiber is consistent with the proportion found by the calculations made in previous test.

Conclusion
The homogeneous distribution and the high amount of fibers will guarantee that post and final core presents the necessary mechanical resistance to guarantee the successful use of the product.

Figure 1 - Sample cross section view.
CLINICALS

Prof. Leonardo Cunha and Prof. Ubiracy Gaião

Initial: buccal view.

Post test: SPLENDOR-SAP placed in the post space prep.
SPLENDOR-SAP sleeve adapted to the post.

SPLENDOR-SAP with dual-cure resin cement

Core build-up.
Simplified!

Customer service
0800 727 3201

www.angelus.ind.br