**Objective**
This study was conducted to characterize the system strength of the TRUESPAN™ Meniscal Repair System as well as that of several other commonly used all-inside meniscal repair devices: the OMNISPAN™ Meniscal Repair System, Fast-Fix 360™, and Ultra Fast-Fix™.

**Methods**
A minimum of 5 samples of each all-inside meniscal repair system were used to repair meniscal tears in young adult porcine menisci. Porcine meniscal tissue was selected as the standardized test medium as it has been established to have similar characteristics as human menisci in external studies\(^1,2,3,4,5,6\).

Vertical longitudinal meniscal tears were created in the tissue samples with a scalpel, roughly 2-3mm from the periphery.

Devices were implanted according to each device manufacturer’s instructions / directions for use, with implants placed in a horizontal mattress configuration. The systems were tensioned until the gap in the torn meniscal tissue was held closed by the implant system as shown in Figure 1.

**Results**
The average system strength results and standard deviations are shown in Table 1, as well as graphically in Figure 3 (the error bars in Figure 3 represent ± 1 standard deviation).

Tissue samples were securely clamped in a custom test fixture as shown in Figure 2 and attached to a servo-hydraulic tensile test machine for mechanical testing.

The mechanical test methods used in this research were based on several previously conducted peer-reviewed studies which investigated meniscal repair devices and techniques\(^7,8\).

For this study, a tensile pre-load of 5N was applied to each construct and then the samples were cyclically loaded from 5N to 20N for 1,000 cycles, at a rate of 1 Hz (1 cycle per second). Upon completion of the 1,000 cycles, constructs were pulled in tension until failure at a rate of 12.5 millimeters per second. The peak load observed during the pull to failure portion of the test was recorded as the device’s “system strength”.

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The TRUESPAN Meniscal Repair System was found to have the highest average system strength of the four devices evaluated in this study at 105.7N, while the OMNISPAN Meniscal Repair System was 101.7N, Fast-Fix 360 was 75.9N, and Ultra Fast-Fix was 94.1N.

<table>
<thead>
<tr>
<th>Device</th>
<th>System Strength Average (N)</th>
<th>STDEV (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRUESPAN Meniscal Repair System⁹</td>
<td>105.8</td>
<td>20.1</td>
</tr>
<tr>
<td>OMNISPAN Meniscal Repair System⁹</td>
<td>101.8</td>
<td>20.9</td>
</tr>
<tr>
<td>Fast-Fix 360¹⁰</td>
<td>75.9</td>
<td>18.9</td>
</tr>
<tr>
<td>Ultra Fast-Fix¹¹</td>
<td>94.1</td>
<td>30.5</td>
</tr>
</tbody>
</table>

References:
1 - Seil et al, “Cyclic Testing of Meniscal Sutures”.
9 – Internal Data: Test Report 103248458
10 – Internal Data: Notebook 2014-10, Pages 5-9
11 – Internal Data: Notebook 2014-10, Pages 15-21