Minimally Invasive Transforaminal Lumbar Interbody Fusion to Treat Lumbar Pathologies

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Introduction

Minimally invasive transforaminal lumbar interbody fusion (MI-TLIF) represents an evolution in spinal surgery. When compared to the normal "open" technique, MI-TLIF is much more versatile providing more relief from spinal stenosis, spondylolisthesis, scoliosis and more. Not only does it provide relief, but this innovative technique also provides collection of local bone graph, which can easily be used to induct the ossification between the newly fused vertebrae.

Methods

243 patients between November 2011 and November 2015 were treated with MI-TLIF. Preoperative evaluation including X-Rays, MRIs, and CT scans were used to determine the source of the back pain and the best possible treatment for optimal clinical outcomes. A BoneBac TLIF device was used to collect autograft tissue to insert into the disc space. Instrumented fusion was achieved with the use of percutaneous pedicle screws.

Figure. 1

Potential problem with open traditional laminectomy, fusion, and instrumentation.

Figure 2.

MIS TLIF System (Thompson MIS, Salem, NH) developed to improve surgical efficacy, cost, and patient outcomes.

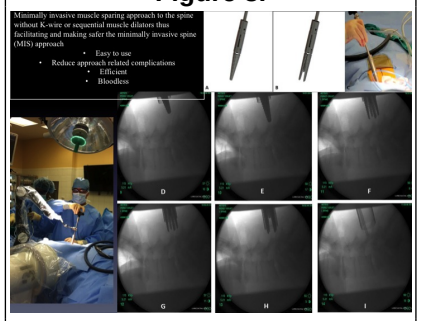
Results

Long-term clinical observations (5 years) have been done. Four measurements were used to evaluate postoperative patients at 12, 24, and 47 months. A physical analogue back pain scale, Oswestry disability index, and the SF-36 mental/physical component scores were used. All showed statistical significance ($P<.05$). Furthermore, adjacent segment disease over a 5-year post-operative period has been approximately 2% compared to 13.6% in traditional open lumbar arthrodesis.

Conclusions

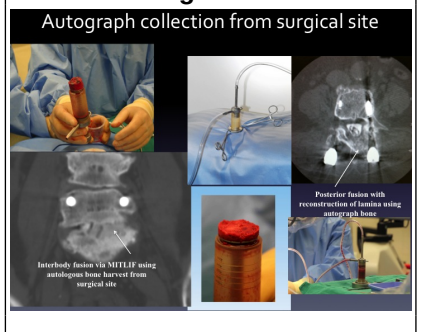
The data collected shows that MI-TLIF provides better clinical outcomes than open TLIF. MI-TLIF provides both short- and long-term statistically significant outcome improvements in patients experiencing low back pain. There were high rates of fusion and low rates of complication. Patients show high levels of satisfaction with the MI-TLIF surgery and many patients become completely pain free within 2-5 years.

Figure 3.



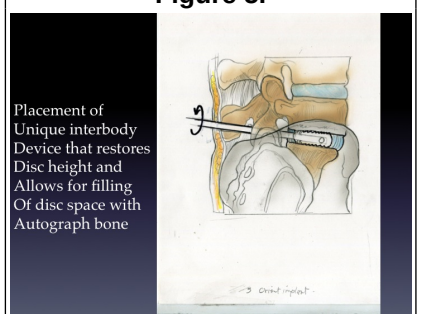
One-Step-Dilator used to improve muscle sparing spine access.

Figure 4.



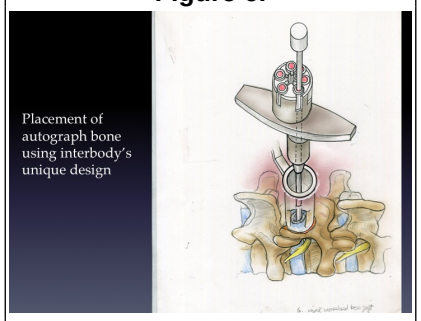
BoneBac Press used to collect autograph from the surgical site.

Figure 5.



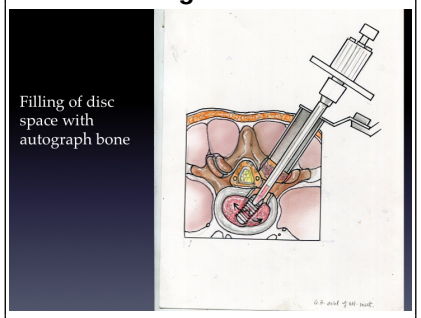
BoneBac TLIF device used to restore disc space height, foramina, and canal diameter.

Figure 6.



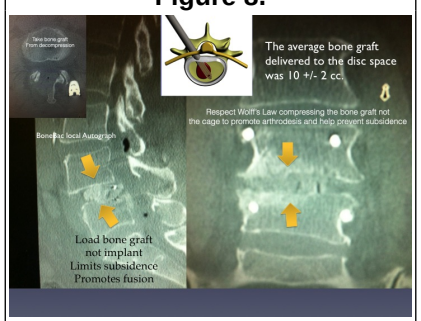
BoneBac TLIF system used to inject morselized autograph collected using BoneBac Press.

Figure 7.



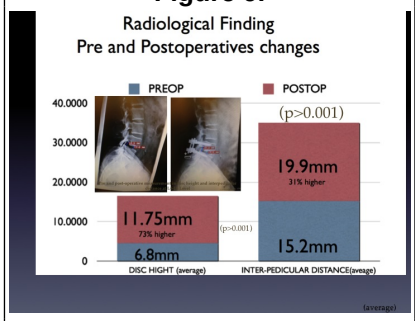
BoneBac TLIF system used for placement of autograph bone in the disc space.

Figure 8.



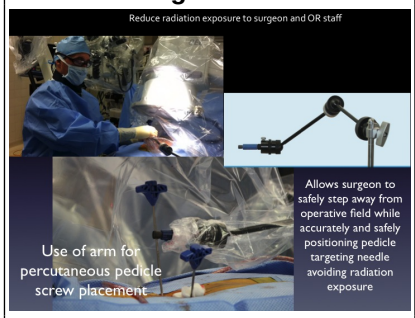
Post operative CT showing decompression, and interbody autograph fusion using BoneBac TLIF system.

Figure 9.



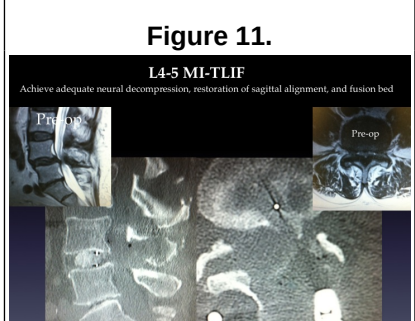
Pre and post-operative restoration of disc height and neural foraminal diameter.

Figure 10.



MinRad system used to prevent radiation exposure to surgeons placing percutaneous pedicle screws.

Figure 11.



Pre and post-operative images after MIS TLIF using BoneBac TLIF system.