Integrated Expandable Interbody Spacer (IEIS)

In minimally invasive (MI) Tateral lumbar interbody fusion (TLIF) operations, expandable integrated interbody spacers have become more popular. Since these devices have local expansion, they can adapt to the intervertebral architecture with perhaps less endplate disturbance and more indirect decompression.

The proposed design will offer a trustworthy option for treating canal stenosis and degenerative disc degeneration. The expandable interbody spacer will be inserted across the disc space. Following that, the spacer may be raised to the required height. The proposed design is incorporated with an autolocking mechanism that will make sure the spacer will maintain its desired height with high accuracy.

Conceptual designs of IEIS

The basic conceptual design of the IEIS is illustrated in Figure 1, where the 3D views of the proposed design of the IEIS are shown. The presented novel design utilizes two endplates (upper & lower), a screw (placed between the two motion guides), and two motion guides. The proposed design can be potentially used in the TLIF with reduce complications associated with revision posterior decompressions. As shoen in Fig. 1, the expandable spacer will be inserted into the disc space in the closed configuration. Once inserted, the height of the spacer will be adjusted via the combination of adjusting screw and motion guiders.

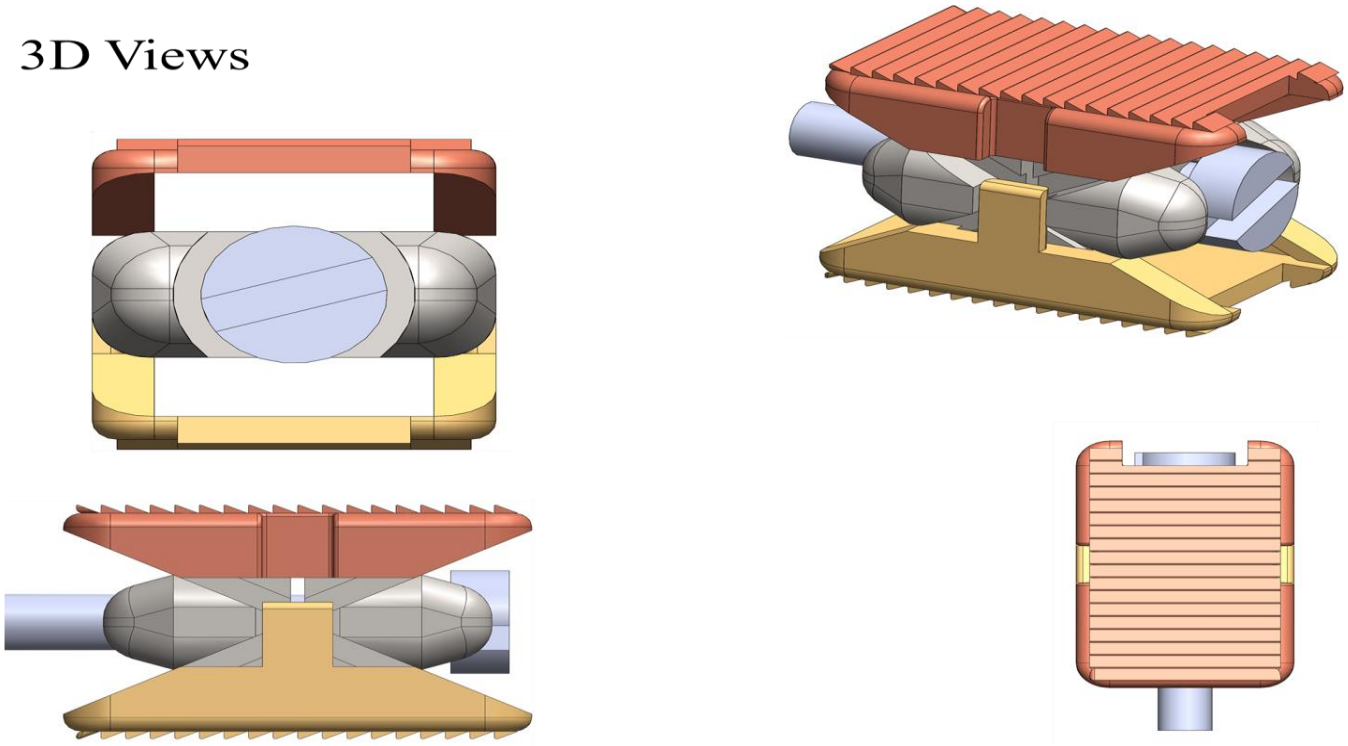

Figure 1. 3D-views of the proposed design model for the expandable interbody spacer.

Detailed design of ASEN

The expandable interbody spacer design has been carried out using computer-aided design (CAD) software, as shown in Figure 2. In the designed integrated expandable interbody spacer, the upper and lower endplates are made to move vertically to adjust the height of the spacer. This tranverse movement of the endplates is achieved by converting the lateral motion of the motion guiders via embedded relative motion path within the design. A dual functioning screw (adjusting & locking) is used to lower and raise the endplates. Clockwise rotation of the screw will cause the motion guiders to move outwards, and hence casuing the endplates to move in the upward direction. Whereas, the counter-clockwaise rotation of the screw will result in motion in the opposite

direction. Once adjusted to the desired height, the endplates can not move in the downword direction by itself due to the selflocking mechanism of the proposed design.

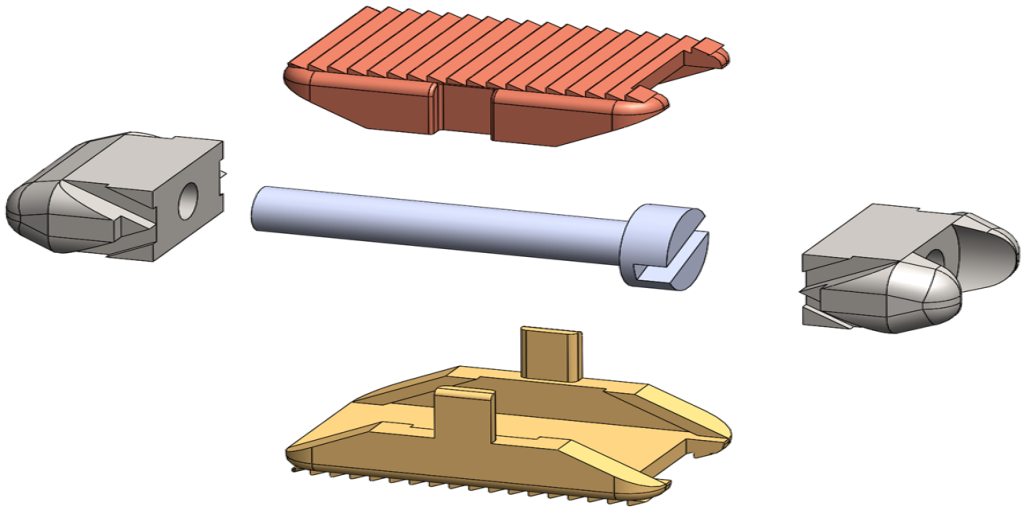

Figure 2. Detailed CAD model of the model for the expandable interbody spacer.

The details and specifications of the expandable interbody spacer design are all demonstrated in Figure 3. Assembled & exploded views of the model are shown in Figure 3. All the parts of the assembly are listed in the disassembled drawing of the model in Figure 3. The 2-D drawings are shown to facilitate a better understanding of the expandable interbody spacer and demonstrate the different parts of the system and its specifications.

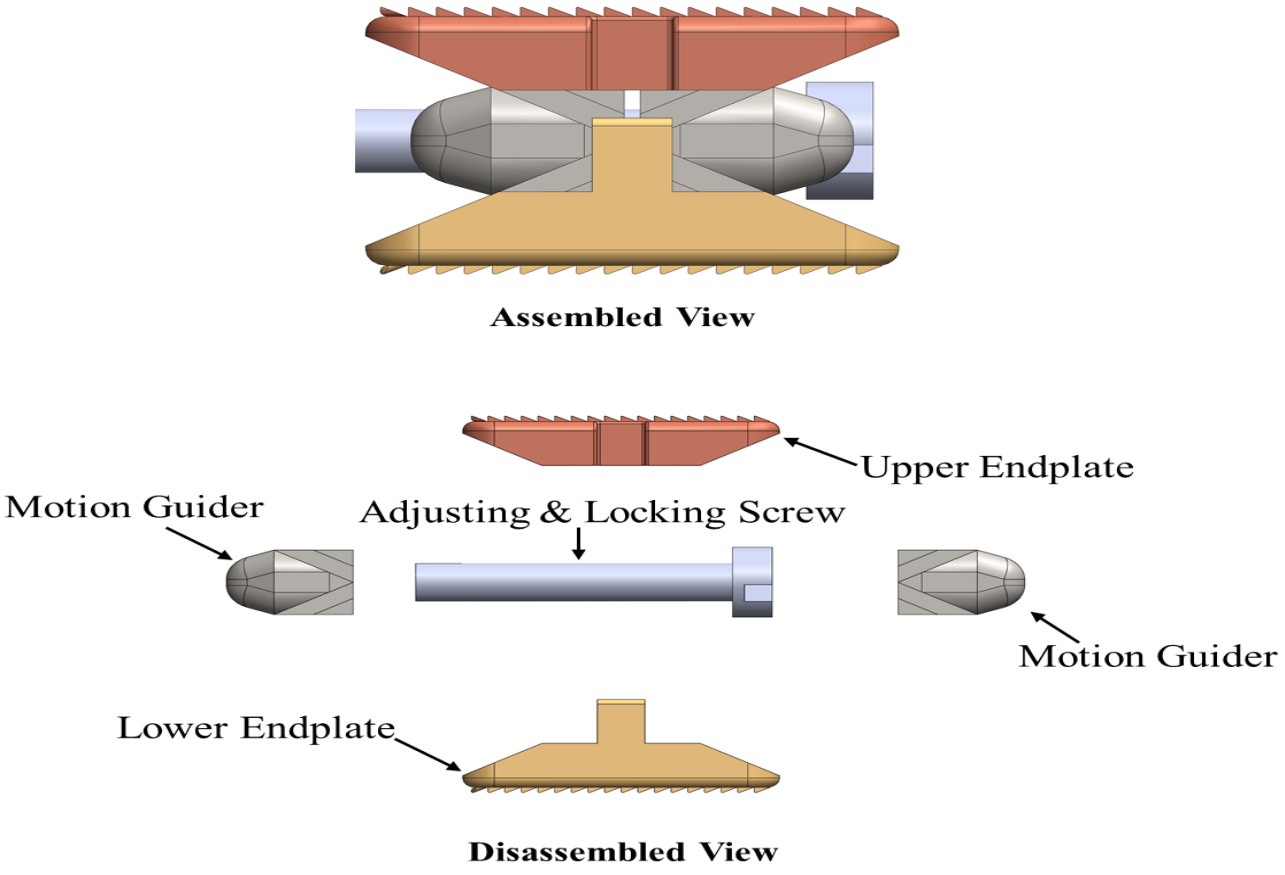

Figure 3. Detailed 2-D drawing of the expandable interbody spacer.