

**Table 20** ASPN Back Consensus Group Recommendations for Interspinous/Interlaminar Fusion Devices

| Recommendation                                                                                                                                        | Grade | Level | Level of certainty<br>Net benefit |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-----------------------------------|
| ISF can be used as a stand- alone device for decompression.                                                                                           | B     | I-B   | Moderate                          |
| ISF can be used as a stand- alone device for spinal fusion                                                                                            | C     | I-B   | Moderate                          |
| ISF is a suitable option to those patients not suited for pedicle screw fixation, non- surgical candidates, and those early in the treatment paradigm | B     | I-B   | Moderate                          |

## Minimally Invasive Sacroiliac Fusion

Sacroiliac joint dysfunction denotes abnormal biomechanics between the sacrum and ileum, typically as a result of hypermobility. With pathological movement or laxity of the sacral ligaments, movement may result in sacroiliitis (inflammation within the sacroiliac joint) and sacroiliac joint pain. Normal movement of the sacroiliac joint is typically limited to 2 to 4 degrees of movement due to the bony architecture and ligamentous structures surrounding the joint. However, if the anatomy is disrupted or degenerative, excessive or limited nutation and counter-nutation may occur.<sup>201</sup> Nutation refers to the anterior-inferior movement of the sacrum, while the coccyx moves posteriorly relative to the ilium; and counter-nutation refers to the posterior-superior movement of the sacrum, while the coccyx moves anterior relative to the ilium. In established cases of SIJ dysfunction, there may be either resultant elements of ankyloses or arthrosis within the joint.

Diagnostic imaging in the form of CT scans, MRIs, and plain film radiographs may provide evidence of degenerative changes within the sacroiliac joints but does not always coincide with the joint as the etiology of pain symptoms. This eventually led to the adoption of diagnostic sacroiliac joint injections. The use of image-guidance substantially improved the accuracy of the injections. To date, diagnostic SIJ injection with image guidance is the most reliable method for diagnosing sacroiliac joint dysfunction.<sup>102</sup>

## Indications

Although there is a diagnostic methodology for SIJ dysfunction, the treatment algorithm has only been more recently defined and continues to evolve.<sup>103</sup> Conservative treatments included bracing, medications, activity modification, manual therapy, chiropractic manipulation, physical therapy, and intra-articular SIJ injections.<sup>202</sup> In the past decade, sacroiliac joint stabilization/fusion has been presented as an option for recalcitrant cases of sacroiliac joint pain. Historically, arthrodesis was performed as an open procedure and used sparingly due to its invasive nature. Surgical stabilization and/or fusion may now be performed via a minimally invasive approach. There are multiple options for sacroiliac joint stabilization/fusion, with the most common being: 1) the lateral approach, and 2) the posterior approach. In the past decade, the use of a minimally invasive transiliac or transarticular (lateral) approach became recognized with multiple high-level studies providing empirical support.<sup>203–211</sup> The use of the posterior approach has been recently proposed as a less invasive and safer procedure. Specifically, the posterior approach avoids the neurovascular bundle.<sup>212,213</sup>

With certain posterior sacroiliac joint systems, an allograft transfixation implant(s) are placed to stabilize the joint for arthrodesis. This is not a new concept, as it was used in a previous study by McGuire et al.<sup>214</sup> Cranial and caudal fibular dowel grafts, harvested from the posterosuperior iliac spine, were demonstrated to be effective in successful fusion of the SIJ. Newer posterior systems include a cortical allograft and therefore negate the need for harvesting of bone. Further distinguishing it is that the procedure is performed minimally invasively, which allows it to be performed on an outpatient basis and does not require weight-bearing restrictions.<sup>215</sup>

## Safety and Complications

Minimally invasive SIJ fusion is a relatively safe procedure but is not without certain risks. Shamrock et al performed a recent review on the safety of transiliac sacroiliac joint fusion. They reported on fourteen studies of a total of 720 patients (499 females/221 males) with a mean follow-up of 22 months.<sup>216</sup> There were 91 reported procedural-related complications (11.11%) with the most common adverse event being surgical wound infection/drainage (n = 17). Twenty-five adverse events were attributed to be secondary to placement of the implant (3.05%) with nerve root impingement (n = 13) being the most