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SI Joint Arthrodesis vs Fixation

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We reviewed the article by Dengler et al. and object to the use of “arthrodesis” in the title and especially in the concluding paragraph of the article to describe the procedure. We are concerned that the phrase

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"sacroiliac (SI) joint arthrodesis" is misleading based on the study's radiographic findings, i.e., "intra-articular fusion with bridging of trabeculae from ilium to sacrum was not commonly observed." Therefore "sacroiliac joint fixation" would be the more appropriate phrase.

Confusingly, this "arthrodesis" study did not even evaluate "bridging bone." The authors specifically stated that "bridging bone, reflecting intra-articular fusion, which was not evaluated in our study, may take longer [than 12 months]." Previous studies investigating the same procedure have reported similar results concerning a lack of bone bridging the sacroiliac joint. For example, Duhon et al. (1) analyzed CT data at 12 months in 159 subjects and concluded that "bridging bone was seen in a minority of cases."

We believe that the term "arthrodesis" entails an osseous union between the bones forming the joint. Arthrodesis is defined by Dorland's Medical Dictionary (2) as "the surgical fixation of a joint by a procedure designed to accomplish fusion of the joint surfaces by promoting the proliferation of bone cells." Clearly "stabilization of the joint with implants" does not meet that definition, and it raises the question as to whether this type of fixation will be permanent.

Typically, when evaluating fusion status of motion segments adjacent to the sacroiliac joint, i.e., the spine, the radiographic analysis attempts to differentiate bridging trabecular bone from continuous bony density (as a result of bone graft between the bones) by using multidetector computed tomography (MDCT). As highlighted by Gilbert et al. (3), "most studies overstate the fusion rate on MDCT because they do not explicitly distinguish between bridging trabecular and continuous bony density." In this SI joint study, this level of scrutiny is seemingly not even required, as there is no bone present in the joint in the majority of cases. Gilbert et al. continues, "fusions with bridging trabecular bone are solid. Fusions with continuous bony density are indeterminate…" Furthermore, in a paper by Williams et al. (4) often referred to by radiologists evaluating spinal fusions, the authors observe that "findings at 12 months are similar to those with the 6-month CT scan. Trabecularization should be more mature with obvious bridging bone between vertebral bodies." This would lead us to conclude that a complete lack of bone within the joint at 12 months is not an arthrodesis.

Fixation, as opposed to fusion or arthrodesis, typically utilizes a device that spans two segments of bone and immobilizes them. The durability of this technique relies on bone fusion secondarily (i.e. for a limb fracture), or healing of disrupted stabilizing ligaments (i.e. for a diastatic SI joint disruption). Devices such as the one described by Dengler et al. constitute a unique hybrid approach, requiring 1) bone growth onto, into and/or through the device 2) ingrowth on both the sacral and ilial side of the device, and 3) durability of the device. Without achieving all three of these landmarks in the absence of a fusion of the SI joint itself, durability cannot be guaranteed long term, in comparison to when a true arthrodesis is included in

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the construct.

Unfortunately, there has been a recent trend in using the term “arthrodesis” to describe certain fixation procedures in spine surgery, which may give the reader the impression that an actual osseous fusion is taking place when in fact a potentially large number of developing nonunions may be occurring. Surgeons who treat sacroiliac joint disease regularly will recognize that the most common failure mode of sacroiliac fusion devices is loosening of the implants within the sacrum and/or ilium. This finding would not likely occur following a solid arthrodesis of the SI joint.

While the subjective clinical results in this paper appear to benefit the patient in terms of pain and disability reduction, the terminology “arthrodesis” should be reconsidered.

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Conflict of Interest:
The authors are board and associate members of the Sacroiliac Medical Expert Group (https://www.simeg-international.com/). Multiple authors also have financial interests in a variety of medical device companies, either in the form of research support, consultation agreements, and/or ownership interest in SI joint-related devices and technology.