

SACROILIAC JOINT FUSION IN A CHRONIC LOW BACK PAIN POPULATION

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The Keating Group

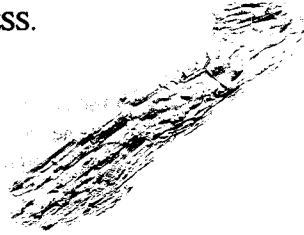
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The sacro-iliac joint (SIJ) as a source of low back pain remains a controversial subject in orthopaedic literature. Before the 1930's orthopaedists frequently implicated the sacro-iliac joint as the painful segment of the low back; but soon after Mixter and Barr introduced the medical world to the herniated nucleus pulposus, the sacro-iliac joint fell out of favor and has never been completely rehabilitated in orthopaedic circles as a worthy diagnosis.

Nevertheless, in our practice we found a significant population of patients with apparent mechanical low back pain who did not respond to a treatment protocol that is normally very effective in ameliorating if not eradicating that pain, and that spurred us to research the possibility that this little used diagnosis was being overlooked in this group of patients.

We turned to physical therapy and osteopathic sources and joined forces with a physical therapist interested in this diagnosis and developed a sacro-iliac joint protocol that we have reported elsewhere in the Second Interdisciplinary World Congress on Low back Pain and its relation to the Sacro-iliac Joint (Avillar, Sims, and Keating). Here we will report our experience with sacro-iliac joint fusion when non-operative treatment has failed.

This investigation studies the effectiveness of SIJ fusion surgery in a chronic LBP workers' compensation population. To evaluate our results we have examined: pre- and post-operative work status, patient self-report of pain, and the number of rehabilitation visits pre- and post-operatively.

This worker's compensation population (N=26 (21 female, 5 male); ht=171.0 cm; wt= 76.2 kg; age= 38.3 years) averaged 38.3 months of LBP prior to being considered for SIJ fusion surgery. Subjects had at least 6 weeks of aggressive rehabilitation (average 17.0 sessions) prior to SIJ fusion surgery. Rehabilitation involved the mobilization of the SIJ followed by isolated lumbar extension resistance training (MedX). When conservative rehabilitation had failed, an injection under fluoroscopy consisting of dye and local anesthesia was administered into the SIJ. A subject pain diary was kept for the next 48 hours following the injection. The SIJ injection served as a screening process for the selection of appropriate SIJ fusion candidates. Patients with abnormal joint pathology and dye extravasation who had relief of their pain with the local anesthetic and none of Waddell's non-organic signs were candidates for SIJ fusion.

At surgery we place the patient in a prone position on radiolucent operating room table. Using C-arm guidance and the PSIS as the reference point, we make a curvilinear incision inferior to the PSIS just medial to the posterior iliac wing. We locate the inferior SIJ just proximal to the sciatic notch, enter the joint and debride it of cartilage and cortical bone for 4-6 centimeters proximally. We remove the PSIS, take cancellous bone from the iliac wing which we pack into the decorticated joint, then wedge the PSIS into the joint. Once we have packed the joint with the combination of cancellous and cortical bone, we percutaneously place two cannulated compression screws across the joint under C-arm control.

Table 1

**The Keating Group
Sacro-iliac Joint Fusion Post-op Protocol**

0-5 days:	Crutches / Increased weight bearing
5 days to 2 weeks:	Full weight bearing Begin Phase I exercises
2nd - 3rd week:	Begin Phase II exercises Increase all daily activities Begin walking Program
3rd - 4th week:	Rehabilitation 3x/wk Treadmill with supervision
4th week:	Begin MedX lumbar extension training Full exercise regimen
4 to 6 weeks:	Return to sedentary work level No lifting greater than 20 lbs. (10kg) Continue with full exercise regimen
8 weeks:	Assess for return to Regular work status Continual increase of all activities
10-12 weeks:	Resume Regular Work Status All sports activities
12 weeks:	Anticipate Maximum Medical Improvement (MMI)
16 weeks:	Discharge at MMI / No sports restrictions



Following surgery we begin a 16 week rehabilitation protocol (Table 1.) with an average of 14.1 physical therapy sessions. In the development of this protocol, it was realized that an increased aggressiveness on the weaning of crutches at earlier times resulted in an overall increase in patient function. The weaning of the crutches was combined with increasing the amount of activities allowed, and thus a decrease in the patient's overall pain levels occurred at much earlier dates. The decrease in subjective pain was also realized in earlier discharge from the program, and possibly at higher levels of function.

Table two comprises the basic set of pelvic stabilization stretches and exercises given to the patients during the above mentioned protocol (Table 1.). These exercises are also prescribed during the initial pre-surgery rehabilitation protocol.

Table 2

The Keating Group Post SI Fusion Home Exercise Program

Exercises should be done 3x/day, and should be done 1 x 15 (increase as instructed)

Phase I (Begin at the start of the second week after surgery):

1. Gluteus Maximus – lie on stomach (keeping the leg straight) lift right/left leg 3–8" off the ground (hold 2–3 sec). Relax. Repeat with the other leg.
2. Latissimus Dorsi– Keeping back straight, perform sitting push-ups.
3. Abdominals – Lie on your back. Bring your knees toward your chest, raising your feet approximately 2 feet off the floor. Hold this position for 2 seconds and tighten lower your feet. Relax and repeat.
4. Pelvic Floor – Kegel Exercises. Tighten the buttock and pelvic floor muscles (2–3 seconds) and relax.
5. Lumbar Area – McKenzie Press-ups.

Phase II (Begin at the start of the third week after surgery):

1. Abdominal bracing
2. Marching while bridged
3. Hamstring curls while prone
4. Walk for 20 minute periods (stop only as pain necessitates)

Phase III (Begin after the third week after surgery):

1. MedX lumbar extension protocol.
2. Progressive resistance exercises in gym workouts.
3. Forward and backward lunges.
4. Hip abduction and hip adduction.
5. Swiss Ball activities (Forward, backward, side to side, and circular roll)

Pain status was recorded in the following manner. The subject self-reported pain was recorded at the start of every session, using this visual analog scale: 0 – no pain, 1–2 occasional pain, 3–4 mild constant pain, 5–6 moderate constant pain, 7–8 unable to do daily activities, 9–10 Emergency, needs to see a doctor. The subject work level status was taken at the onset of rehabilitation, prior to surgery, after surgery, and at the end of the rehabilitation process. Work status was taken in an attempt to grade functional status in this population. Work level status was assigned as: 0 – no work, 1 – actively looking for work, 2 –sedentary, 3 – light duty, 4 – moderate duty, 5 – full duty.

ANOVA reveals a significant ($p < 0.01$) decrease in subject reported pain. The pre-SIJ fusion surgery pain fell from an average of 6.1 to a post-surgery (1 week post-operation) average pain level of 3.4. The average pain level after the rehabilitation process fell to an average pain level of 2.9, this was a significant change when compared to the pre-surgery pain level, but not a significant change in pain status as compared to the average post-surgery pain level. ANOVA reveals that the patient's work status had significantly increased ($p < 0.01$) from a pre-surgery average of 2.3 to a post-rehabilitation work status average of 3.3. Of interest, 5 patients returned to some form of gainful employment from an unemployment history that averaged 16.8 months prior to their rehirement, after SIJ fusion surgery. Returning from such a great absence in a workers' compensation population is highly unusual, and shows great promise.

This data indicates that SIJ fusion is an effective pain reducing agent, and a functionally restorative operation for chronic LBP sufferers (average LBP prior to SIJ fusion 38.3 months) who have a SIJ dysfunction. This research group believes that the conservative care provided prior to SIJ fusion is a paramount concern before any surgery is contemplated. This research team also believes that a positive finding for SIJ abnormality utilizing local anesthesia and contrast materials fluoroscopically injected into the SIJ is the gold standard for the determination actual need for a sacro-iliac joint fusion. The mechanical fusion of the SIJ exhibits hope for LBP sufferers that have long been overlooked or cast off in the past.

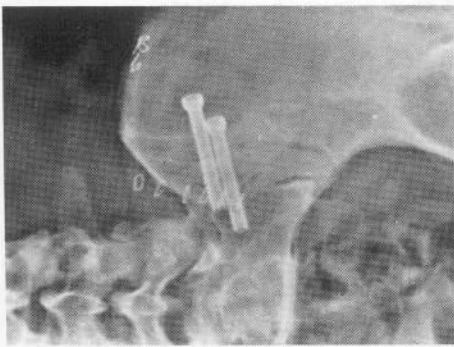


Figure 1: Post-operative x-ray showing two cannulated screws bridging ilium and sacrum

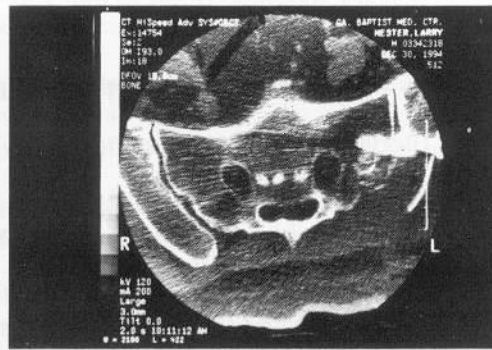


Figure 2: CT scan showing appropriate placement of screws across SIJ.

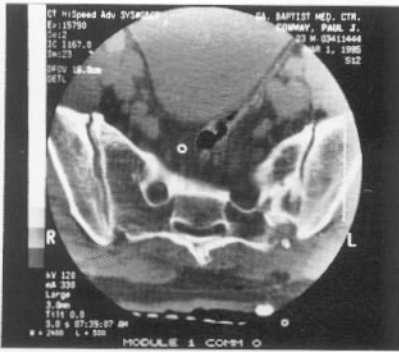


Figure 3: CT scan showing bone graft in SIJ.

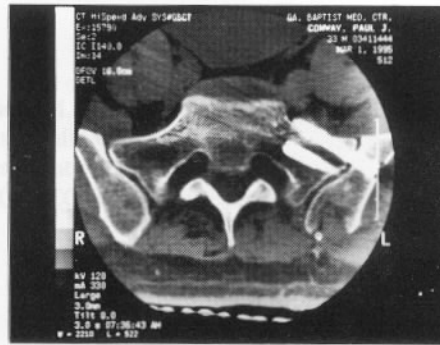


Figure 4: CT scan of complication: screw anterior to sacrum; this is very difficult to assess using fluoroscopy alone, and we routinely do post operative CT scans to insure that our screws are well placed.

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