Predictive Factors and Subgroup Analysis of Patient Satisfaction Rates With Long-term Outcomes Following Sacroiliac Joint Fusion

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Introduction

The demographics and preoperative care profile of patients who are diagnosed with a SIJ pain generator are complex and heterogeneous. To characterize this complexity and to identify any indicative factors for future surgical satisfaction, we performed multivariate analyses and a subgroup comparison study.

Methods

Patients with low back pain were diagnosed using an algorithm for SIJ pain1. Candidates for a SIJ fusion were admitted over five-year. Each patient's electronic medical record pre and post operatively was evaluated as well as a long-term functional questionnaire Data is analyzed using unpaired t-test, Fisher's exact test, logistic regression analysis and discriminant analysis.

Results

Pre-operative demographics illustrated the complexity of the patients in terms of length of conservative tx, lack of function, missed diagnoses, and high narcotic use. Peri-operative data consisting of "bilateral SIJ fusion", "use of bone dowel or cage" statistically correlated with an increased hospital stay, and the "use of bone morphogenetic protein" with increased blood loss. Post-operative and f/u data consisting of decreased dyspareunia and no use of narcotics were the only two variable that statistically correlated with a patient having a satisfactory result. Overall satisfaction rates here as listed in Fig 1.

*: P < 0.05; **: P < 0.01; ***: P < 0.001,
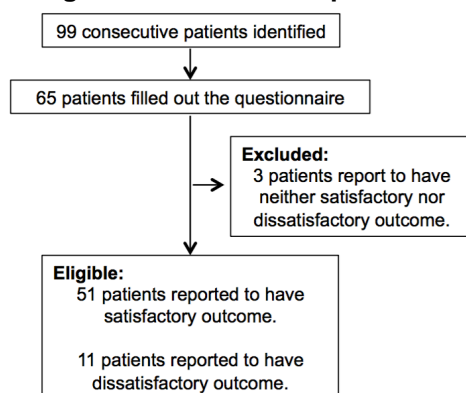
Fig1. The flow-chart of patients.

99 consecutive patients identified
↓
65 patients filled out the questionnaire
↓
Excluded:
3 patients report to have neither satisfactory nor dissatisfactory outcome.

Eligible:
51 patients reported to have satisfactory outcome.

11 patients reported to have dissatisfactory outcome.

Table. Contributory factors

	P values
Factors correlated with surgery satisfaction.	
No dyspareunia after surgery	0.024*
No postoperative narcotics use	0.031*
Factors correlated with blood loss	
Female sex	0.011*
Preoperative medication use	0.026*
Anti-inflammatory and/or narcotics	
Have previous spinal surgery	0.034*
Have previosu bilateral SIJ fusion	0.026*
BMP use	0.027*
Dyspareunia before surgery	0.041*
Factors correlated with a longer hospital stay †	
Heart diseases	0.021*
Pulmonary diseases	0.002**
Bilateral fusion	0.012*
Bone dowel use	0.005**
Spinal cage use	0.020*
Postoperative back pain	<0.001***
Postoperative leg pain	< 0.001***
Postoperative sitting pain	0.006**
Postoperative complications	< 0.001***
Factors correlated with postoperative complications	
Pre-existing pulmonary diseases	0.004**
Postoperative leg pain	0.047*
A longer hospital stay	0.0012**

¶ All variables tested are: sex, ATF, BMI, pre-op. working status, pre-op. disability rate, diabetes, smoking, obesity, heart diseases, pulmonary diseases, scoliosis, previous lumbar and/ r SIJ fusion, previous complications from fusion(s), months of pre-op. treatments, pre-op. physical therapy and pain clinic usage, pre-op. medications, surgical BMP, bone dowel and/or spinal cage use, BL (ml), bilateral/ unilateral fusion, the # of previous surgeries, LOS, post-op. complications, postoperative back pain, leg pain, walking pain, sitting pain and weight life (Ibs), dyspareunia before and after surgery, post-op. disability, working rate, use of anti-inflammatory, use of narcotics, use of pain clinics, and post-op. satisfaction.

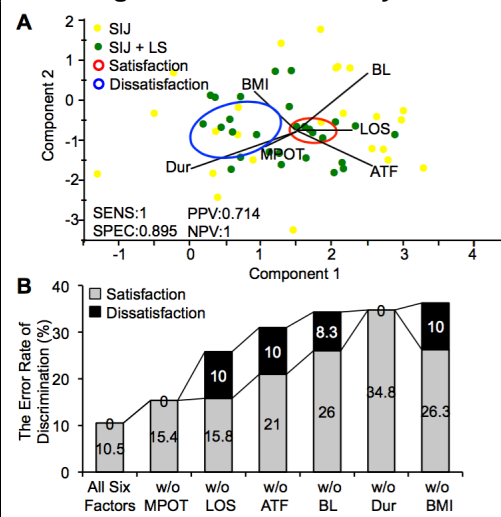### Fig2. Discriminant analysis

Fig2. Satisfactory outcomes of SIJ +/- LS procedures can be discriminate based on the age at time of fusion (ATF), months of preoperative treatments (MPOT), duration (Dur: minutes), Blood Loss (BL: ml), Length of Stay (LOS).

A. The biplot of a discriminant analysis, showing two morphoclusters. Each point represents a patient data. Each linear trajectory represents one variable. The ellipse corresponds to a 95% confidence limit for satisfaction or dissatisfaction identification. Discriminative analysis is constructed using 'regularized method'. SENS: sensitivity. SPEC: specificity. PPV: Positive prediction value. NPV: Negative prediction value. **B.** BMI and surgical Dur are the two greatest factors contributing to the discrimination power. The lowest error rates of predicting satisfactory and dissatisfactory outcomes are 10.5% for dissatisfaction (black) and 0% for satisfaction (gray), respectively, using all six factors to build the model. Removing any one of the six variables, leads to increased error rates of prediction. Excluding either Dur or BMI leads to the greatest increased error rate. n = 48.

Fig3. Dyspareunia improvement after surgery.
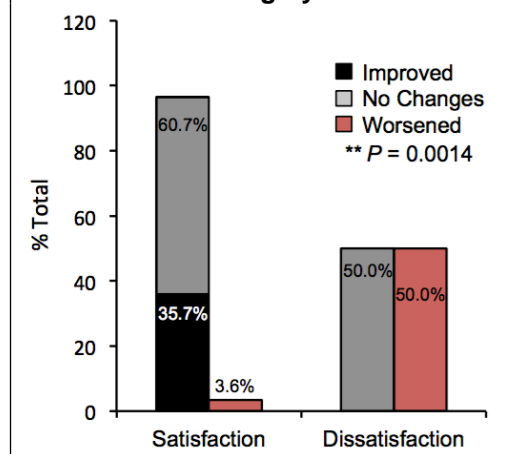
Learning Objectives

- Describe the complexity of patient presentation.
- Explain how factors can be predictive of future satisfactory outcomes.

Conclusions

The presenting patient needing a SIJ fusion can be very complex on many levels. Despite this high satisfaction rates can be obtained. This study demonstrates that the only variables that statistically correlate with long-term patient satisfaction after SIJ fusion surgery are decreasing or eliminalting dyspareunia, and eliminating the need for narcotics to control pain.

References

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2.Laslett M: Evidence-based diagnosis and treatment of the painful sacroiliac joint. J Man Manip Ther 16:142-152, 2008