Abstract

Background: Sacroiliac joint (SIJ) pathology is often said to be underdiagnosed. However, there is a lack of strong evidence that could prove the prevalence and correlation of SIJ with its risk factors. This is a single-centre retrospective observational study to produce literature evidence on the prevalence of SIJ pathology detected through imaging.

Methods: Medical records over the span of 9 years are analysed to identify patients that had SIJ imaging. These patient records were then transcribed into a quantitative data set to calculate the prevalence of SIJ disease and its association with known risk factors.

Results: 256 patients are included in this study and roughly 11% of patients are identified to have pathological SIJ. There was no statistically significant correlation of SIJ pathology to any known risk factors found in this study.

Conclusion: The real prevalence of SIJ pathology remains debatable. More literature evidence from more robust studies is required to create a pool of evidence for meta-analysis in the future.

Introduction

Sacroiliac joint (SIJ) has long been discussed as a source of low back pain +/- leg symptoms and the latest literature argues it is underdiagnosed and under-recognised(1). The existing literature suggests a prevalence rate ranging from 15-30% as a cause of low back pain (LBP)[1]. However, there is a lack of conclusive literature that could demonstrate convincing prevalence rates of SIJ dysfunction due to studies adopting a wide range of diagnostic criteria(2).

The SIJ serves as the largest axial joint in the human body, contributing support for human bipedalism[1]. This is achieved by evolutionary features of form closure and force closure, unique to the SIJ where less muscle and ligament force is required to support the upper trunk[2,3]. With the SIJ's main function to transfer weight to and from the lower limbs to the axial skeleton, it is crucial to have minimal motion at this joint, around 2-4 mm of movement in any plane[1,4]. The exception for SIJ mobility is during gravidity and parturition where sex hormones cause increased ligamentous laxity, allowing for more movement in the SIJ[1,5].

Aims/ Objectives

This study aims to produce literature evidence on the frequency of SIJ pathology detected through imaging on patients that presented to a spinal surgery clinic and subsequently had a Magnetic Resonance Imaging (MRI) of their lower back. Through this study, we also look at any common presentation or risk factors that are present in patients with SIJ pathology detected on MRI.

Methods

This retrospective observational study looked at patients that presented to a single spinal surgeon private practice clinic in Vale Hospital, Vale of Glamorgan, United Kingdom. All patients that presented from February 2014 to November 2022 are included in the dataset for this study. Across all these patients, patients that had an MRI scan of the lumbar or lumbosacral or pelvis are identified and filtered. These patients are analysed through their clinic letters to evaluate their presenting history, risk factors, previous medical history and examination findings. A review of their MRI scan findings and further treatment, if any, are also noted down.

Patients with previous SIJ surgery, incomplete or lost records, follow-up post-surgery and known malignancy are excluded. Patients that did not have their SIJ included in the scans were also excluded.

The list of quantitative features evaluated in each patient is detailed in Appendix 1 and logged using binary except for job and age at presentation, which is calculated to years.

All data are collected in a password-secured Microsoft® Excel spreadsheet with patient-identifiable information removed. Once data collection is complete, statistical analysis is carried out with IBM® SPSS® Statistics version 27.

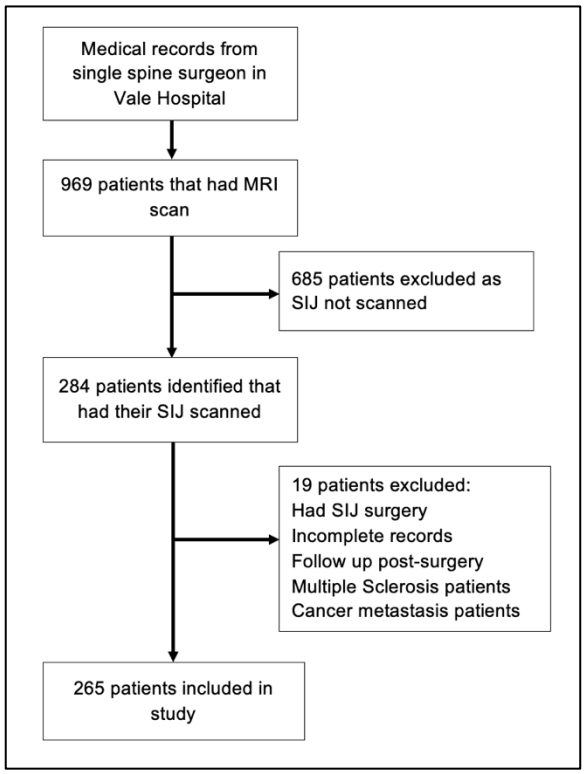

Figure 1

Results

A total of 969 patients had an MRI spine of their lumbar or pelvis during the 9-year period. Among these, 284 patients had their SIJ included in the MRI scan as well. 7 patients had SIJ surgery previously, 6 patients had incomplete or missing records, 3 patients were follow-up post-surgery and 2 had multiple sclerosis and 1 had known malignancy. These patients were excluded as per exclusion criteria leaving 265 patients.

Within the 265 patients that are valid for the study, 123 (46.4%) patients were male and 142 (53.6%) were female. The mean age of patients is 52.2 years (range 13 - 91 years).

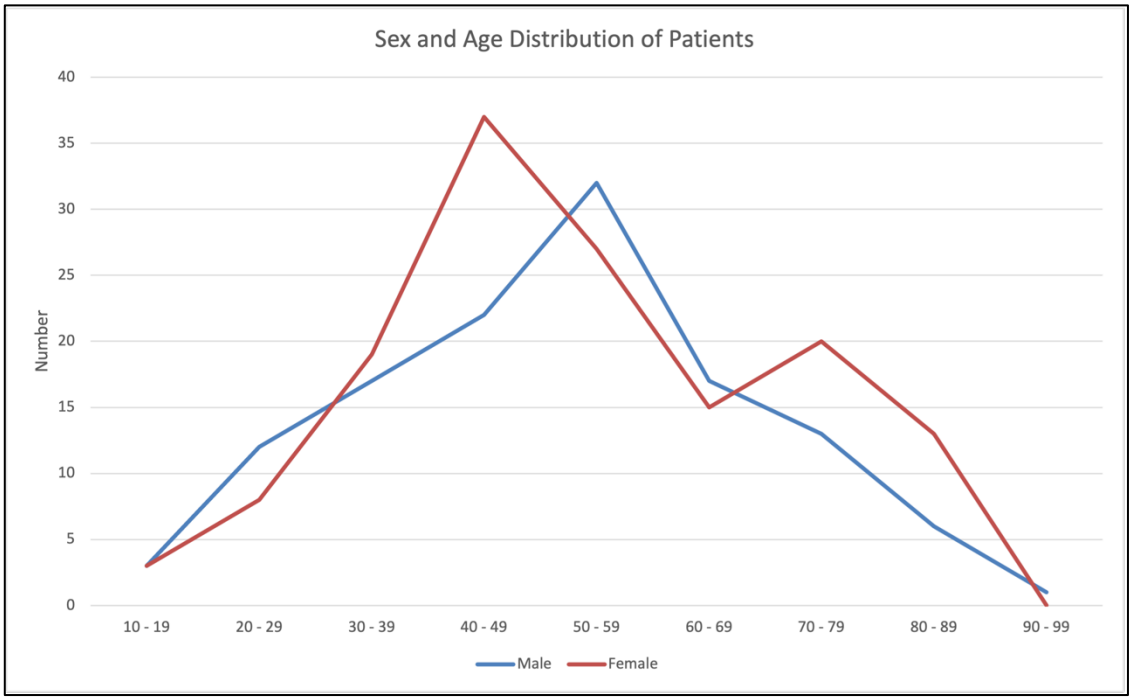

Figure 2

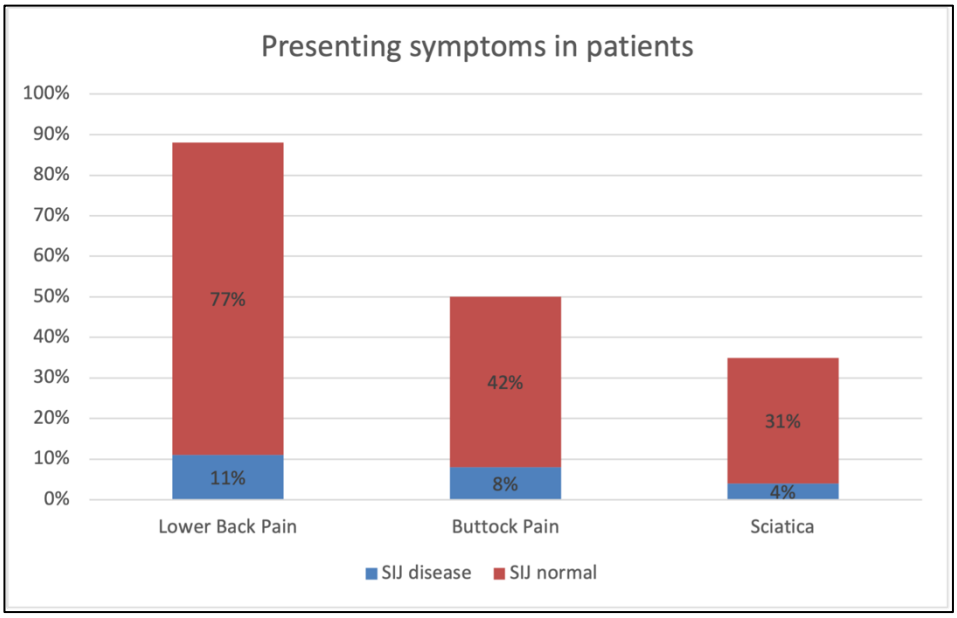

Figure 3

A total of 31 (11.7%) patients were found to have pathological SIJ from their MRI results. Among these, inflammatory SIJ took up 38.7% (n=12) of pathological SIJs whereas degenerative SIJ was responsible for 61.3% (n=19).

Of the total patient sample, 12 (9.8%) males and 19 (13.4%) females had pathological SIJ. There was no statistically significant correlation between sex and SIJ disease as assessed by Fisher's exact test, p=0.444.

The age of patients also shows no significant difference in the prevalence of SIJ disease via Point-biserial correlation, $r_{pb}(263) = -0.038$, p=0.540.

The common presenting symptoms for patients who had their SIJ scanned are Lower Back Pain (LBP), buttock pain and sciatica. These symptoms can be found in most patients with LBP reaching 88%, buttock pain at 50% and sciatica at 35% in the total sample group regardless of SIJ disease presence.

Figure 3 shows the breakdown of patients that presented with mentioned symptoms and whether they have SIJ disease. For example, 88% (n=235) of all patients presented with LBP but only 11% did have SIJ disease whereas the other 77% contributed by SIJ normal patients.

Figure 4 shows a similar pattern where a summary of medical history of patients is plotted on a bar chart showing the percentages of patients with a specific history. These features are calculated with Fisher's exact test to identify if there is a correlation with SIJ disease. All features listed above did not show statistically significant correlation as none reached the threshold of $p<0.05$.

Figure 5 shows the percentage of patients that had the idea or were told by a healthcare professional that SIJ was the cause of symptoms. The majority of patients that had the idea or were told that their SIJ had disease actually have normal SIJs.

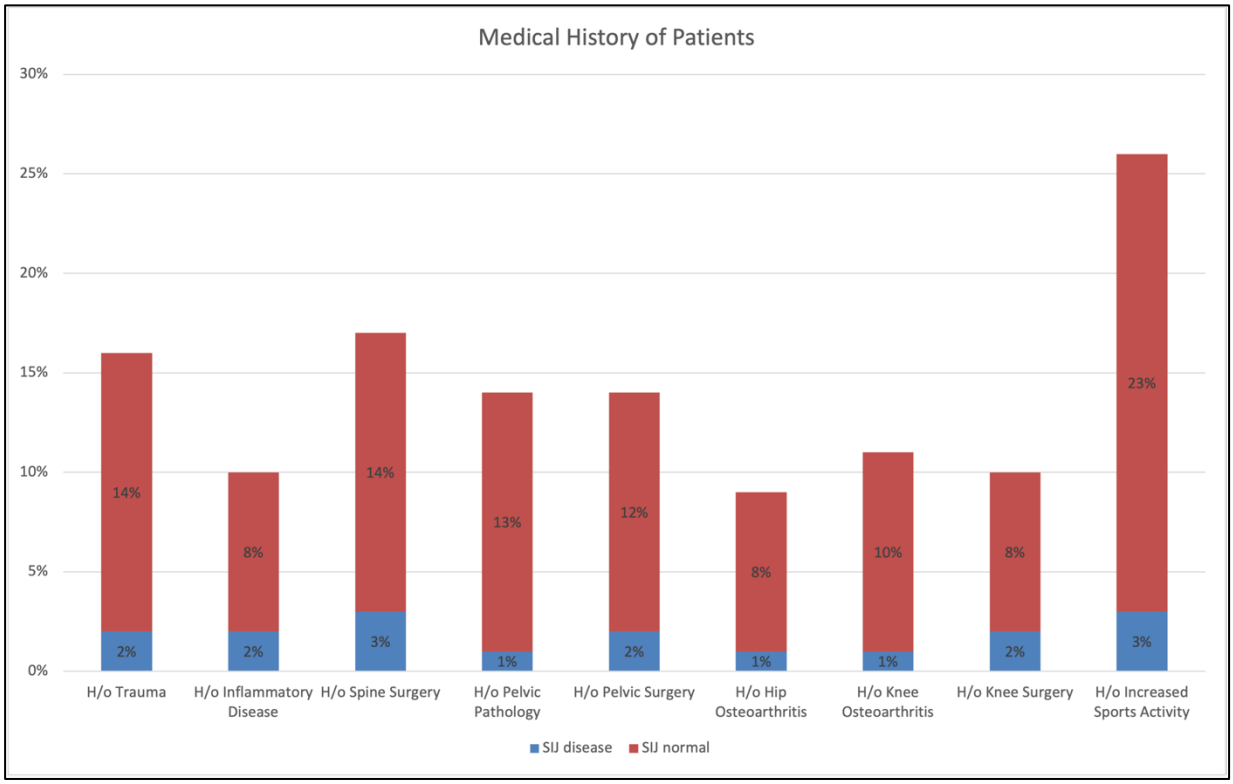

Figure 4

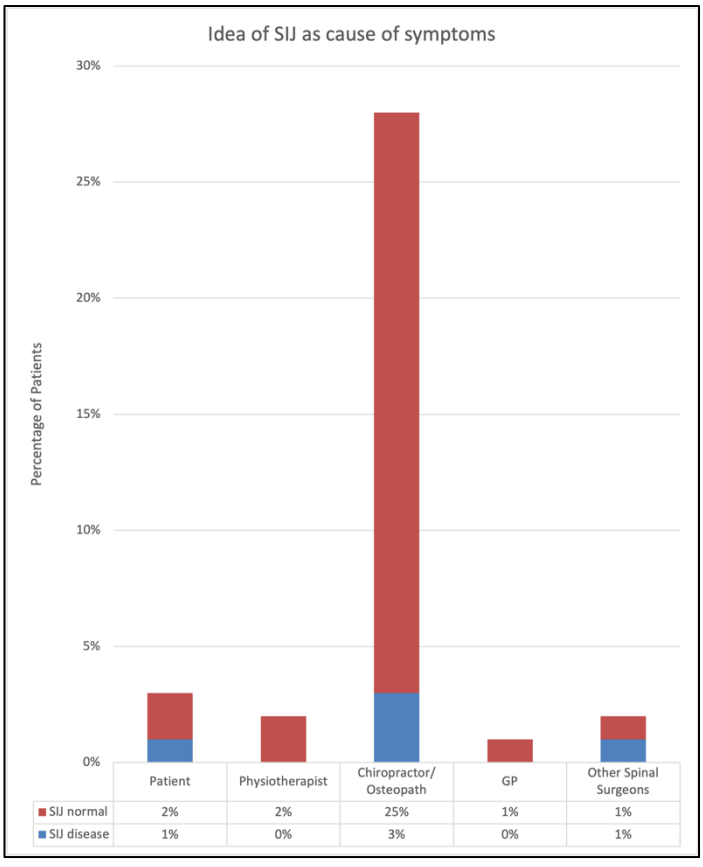

Figure 5

Leg length discrepancy poses a higher risk for SIJ disease whereas FABER and Thrust test was routinely used in a clinical environment to ascertain if there is disease in SIJ.

The sensitivity and specificity of these examination findings are calculated. Leg length discrepancy has a very low sensitivity of 6.9% but high specificity of 97.4%. FABER and Thrust test have a calculated sensitivity of 19.4% and 22.6% respectively and a specificity of 85.5% and 88.0%.

Discussion

This study demonstrated the prevalence of SIJ disease in a single centre was lower than the conventional range of 15-30% based on current literature. This adds to the uncertainty as to the actual prevalence of SIJ disease in the general population. Further analysis of this study sample group should be done to determine if the SIJ was the cause of symptoms or was symptoms alleviated via treatment to other spinal pathologies.

The data also does not show a statistically significant correlation between a spine surgery history and pelvic surgery with SIJ disease, contrary to the current literature that states spine and pelvic surgery as a risk factor for SIJ disease[1]. Leg length discrepancy which is long thought to have caused SIJ dysfunction was also not found to have a significant correlation in this study sample[1,2].

This study involves patients seen over a 9-year period with a total sample size of 256 patients. This is a considerably big sample size and adds to the strength and reliability of the dataset.

Although this study serves to contribute literature evidence on the prevalence of SIJ pathology and its relevant features, it has a few notable limitations. There might be information bias and human errors while interpreting the medical records as this is a retrospective observational study. There was no pre-existing uniform method to record the patient's presenting history and radiological findings. Although the study population have a wide age range and equal sex distribution, the patients are all from a single centre, reducing the generalizability of the study results.

More work needs to be done for data analysis, specifically to look for multiple collinearities of presenting features of patients through multiple regression models. This would allow us to identify if any combination of presenting symptoms or medical history would prove a correlation with SIJ disease. To reduce bias, it would be recommended for multiple authors to go through the medical records separately to create the dataset. A multi-centre study would also generate a more robust literature evidence base.

Conclusion

The results from this study are inconsistent with current literature evidence regarding SIJ prevalence and risk factors associated. Given that there is very little recent literature on SIJ disease, it is arguable that the true prevalence would remain unknown until more literature evidence is available. A more robust study methodology that involves multicentre and quantitative data collection is essential to create robust evidence that would improve clinical decision-making for LBP and ultimately patient care.

Acknowledgement

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Appendix 1

Features:

1. Age
2. Job
3. Sex
4. Depression or Anxiety
5. H/o Buttock pain
6. H/o LBP
7. H/o Sciatica
8. H/o urine incontinence
9. H/o faecal incontinence
10. Decrease in ADLs due to pain
11. H/o Trauma
12. H/o Spine Injection/ Radiofrequency therapy
13. H/o SIJ injection
14. H/o Pelvic Pathology
15. H/o Pelvic Surgery
16. H/o Spine Surgery
17. H/o inflammatory disease
18. Osteoporosis
19. Hip Osteoarthritis
20. Knee Osteoarthritis
21. H/o Knee Surgery
22. H/o Increased Sport Activity
23. Patient thought SIJ as cause
24. Physiotherapist thought SIJ as cause
25. Chiropractor/ osteopath thought SIJ as cause
26. GP thought SIJ as cause
27. Spine surgeon thought SIJ as cause
28. FABER test
29. Thrust test
30. Leg Length discrepancy
31. SIJ disease
32. Pathology at other areas
33. Treatment for other spine pathology