

Has Arthroscopic Meniscectomy Use Changed in Response to the Evidence? A Large-database Study From Spain

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Received: 30 April 2022 / Accepted: 2 September 2022 / Published online: 3 October 2022
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Abstract

Background Several randomized clinical trials on the treatment of meniscal tears have shown that surgery is not superior to nonoperative treatment in middle-aged and older adults. However, clinical practice has not changed consistently worldwide in response to this evidence, and arthroscopic meniscectomy remains one of the most frequently performed operations.

Each author certifies that there are no funding or commercial associations (consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article related to the author or any immediate family members.


All ICMJE Conflict of Interest Forms for authors and *Clinical Orthopaedics and Related Research*® editors and board members are on file with the publication and can be viewed on request. Ethical approval for this study was obtained from the Arnau de Vilanova Hospital, Valencia, Spain (number HAV 41/2021). This work was performed at the Department of Orthopaedic Surgery, Arnau de Vilanova Hospital, Valencia, Spain.

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Questions/purposes (1) How has the use of arthroscopic meniscectomy changed in Spain between 2003 and 2018, particularly in middle-aged (35 to 59 years) and older patients (over 60 years) relative to younger patients? (2) How have surgical volumes changed across different healthcare areas in the same health system? (3) How has the proportion of outpatient versus inpatient arthroscopic procedures changed over time?

Methods Data on all 420,228 arthroscopic meniscectomies performed in Spain between 2003 and 2018 were obtained through the Atlas of Variations in Medical Practice project (these years were chosen because data in that atlas for 2002 and 2019 were incomplete). This database has been promoted by the Spanish Health Ministry since 2002, and it collects basic information on all admissions to public and publicprivate partnership hospitals. The Spanish population of 2003 was used to calculate age- and sex-standardized rates of interventions per 10,000 inhabitants and year. To assess the change in standardized rates among the age groups over the study period, a linear regression analysis was used. Standard small-area variation statistics were used to analyze variation among healthcare areas. Data on outpatient surgery and length of stay for inpatient procedures were also included.

Results The standardized rate of arthroscopic meniscectomy in Spain in 2003 was 4.8 procedures per 10,000 population (95% CI 3.9 to 5.6), while in 2018, there were 6.3 procedures per 10,000 population (95% CI 5.4 to 7.3), which represents an increase of 33%. Standardized rates increased slightly in the age group < 35 years (0.06 interventions per 10,000 inhabitants per year [95% CI 0.05 to 0.08]), whereas they increased more markedly in the age groups of 35 to 59 years (0.14 interventions per 10,000 inhabitants per year [95% CI 0.11 to 0.17]) and in those 60

years and older (0.13 interventions per 10,000 inhabitants per year [95% CI 0.09 to 0.17]). The variability among healthcare areas in the meniscectomy rate progressively decreased from 2003 to 2018. In 2003, 32% (6544 of 20,384) of knee arthroscopies were performed on an outpatient basis, while in 2018, these accounted for 67% (19,573 of 29,430).

Conclusion We observed a progressive increase in arthroscopic meniscectomies in Spain; this procedure was more prevalent in older patients presumed to have degenerative pathologic findings. This increase occurred despite increasing high-level evidence of a lack of the additional benefit of meniscectomy over other less-invasive treatments in middle-aged and older people. Our study highlights the need for action in health systems with the use of financial, regulatory, or incentive strategies to reduce the use of low-value procedures, as well as interventions to disseminate the available evidence to clinicians and patients. Research is needed to identify the barriers that are preventing the reversal of interventions that high-quality evidence shows are ineffective.

Level of Evidence Level III, therapeutic study.

Introduction

Arthroscopic meniscectomy has been the traditionally recommended surgical treatment for meniscal tears, which occur in people of varying ages and are especially common in people older than 50 years [9]. In fact, it is one of the most commonly performed orthopaedic procedures [15, 24, 28]. However, its use in degenerative meniscal injuries has been questioned; numerous randomized controlled trials (RCTs) [17, 19, 25, 51] and systematic reviews [6, 27, 39] have demonstrated that meniscectomy in symptomatic middle-aged and older patients is not superior to structured rehabilitation or placebo surgery, even in patients with so-called mechanical symptoms [13, 49] or those with unstable tears [55]. In addition, knowledge of the biomechanical role of the meniscus has increased interest in meniscus-preserving therapy, such as repair techniques or even nonsurgical treatments [26], because meniscectomy may be associated with an increased risk of worsening cartilage damage [46]. Finally, the meniscus as the origin of the symptoms has been questioned [11] because so many meniscal tears that are seen on MRI are asymptomatic [5, 9] and because meniscal tears are frequently coexistent with knee osteoarthritis [7, 10].

Medical reversal occurs when new, high-quality studies contradict widespread clinical practice [44]. Despite the strong evidence against meniscectomy, the translation of new knowledge into clinical practice has been variable. Some longitudinal studies of meniscectomy use reported a slight decrease [1, 12, 21, 23, 29], while others reported an

increase [8, 31, 54]. Factors that may prevent medical reversal include regulations imposed by health administrators, economic incentives, and deficits in the dissemination, acquisition, and application of new evidence by physicians [36]. Some studies in a recent narrative review [34] highlighted organizational measures and economic incentives as facilitators to or limiters of changes in clinical practice and indicated that educational and knowledge dissemination strategies have relatively less impact. In Spain, a country with a public health system recognized for its efficiency and health outcomes [14, 35, 40, 56], health authorities and medical societies have not provided clinical practice guidelines (CPGs) or performed campaigns to reduce the number of meniscectomies. Physicians in public hospitals have a fixed salary, and these hospitals do not have a fee-for-service system, so economic incentives have little impact on clinical practice. Thus, an eventual change in the rate of arthroscopy in Spain may be attributed mainly to the passive acquisition of new evidence by surgeons. Research on the overuse of low-value procedures requires identifying their existence and frequency to alert health managers, clinicians, and patients [36]. We hope this kind of reporting would likewise influence individuals practicing in other healthcare systems, because the delivery of high-quality, high-value care is a goal shared by all surgeons and healthcare administrators.

We therefore asked: (1) How has the use of arthroscopic meniscectomy changed in Spain between 2003 and 2018, particularly in middle-aged (35 to 59 years) and older patients (over 60 years) relative to younger patients? (2) How have surgical volumes changed across different healthcare areas in the same health system? (3) How has the proportion of outpatient versus inpatient arthroscopic procedures changed over time?

Patients and Methods

Study Design

This was an observational, large-database study on meniscal tears treated with arthroscopic resection in the Spanish National Health System between 2003 and 2018. The database has been available since 2002, but for that year and 2019, data are incomplete, so these years were excluded from the study.

Setting

The study was conducted in the Spanish National Health System, an almost-universal system with a decentralized structure that has 17 regional National Health Services administered by the 17 autonomous governments of the

regions in Spain [32]. The regional National Health Services manage an extensive network of hospitals (approximately 75% of acute-hospital beds in Spain) and specialized outpatient and primary healthcare centers. In 2018, the Spanish National Health System was organized into 203 healthcare areas, a geographic territory served by one hospital that provides specialized inpatient and outpatient care to the residents in that area. Most healthcare areas have a population between 80,000 and 265,000 inhabitants (median 160,000 inhabitants).

Data Sources

Data were collected in December 2021 from the Spanish Atlas of Variations in Medical Practice Project database. The Atlas of Variations in Medical Practice Project, fully described elsewhere [4], is a collaborative project that extracts data from the Minimum Basic Hospital Discharge Dataset of the 17 Spanish regional National Health Services. The Minimum Basic Hospital Discharge Dataset includes individual anonymized clinical (diagnoses and procedures), demographic (age, gender, and healthcare areas of residence), and administrative data (admission, discharge, and main procedure dates, as well as ambulatory surgery) of all discharges in the regional National Health Services hospitals.

Diagnoses and procedures are coded according to the International Classification of Diseases, 9th revision Clinical Modification, until 2015, and the Classification of Diseases, 10th revision Clinical Modification Spanish version, from 2016 onward. At the time of data extraction, the Atlas of Variations in Medical Practice database included all discharges from public hospitals of the 17 regional National Health Services between 2003 and 2018 (including ambulatory major surgery) except for the Galicia region from 2016 to 2018. It does not have information on admissions to private hospitals, except for those integrated into the public network as publicprivate partnerships. The population denominators for each year were obtained from the annual census of the Spanish National Institute of Statistics.

Population

This study included all patients in the Spanish National Health System (except those in Galicia between 2016 and 2018) who were admitted to the hospital from 2003 to 2018 (or outpatient surgery) and underwent arthroscopic meniscectomy for a meniscal tear as the main surgical indication (Supplemental Table 1; <http://links.lww.com/CORR/A950>), excluding other knee procedures in which meniscectomy is an added technique, such as ACL reconstruction.

A total of 420,228 arthroscopic meniscectomies were identified during the study period, and the number grew from 20,384 in 2003 to 29,430 (excluding Galicia) in 2018 (Table 1). The mean age of the cohort was 49 ± 15 years. Sixty-two percent (261,345 of 420,228) were men (Supplemental Table 2; <http://links.lww.com/CORR/A951>).

Variables

The main outcome variable of the study was the age- and gender-standardized rate of meniscectomy per 10,000 inhabitants and year in each healthcare areas, stratified by age groups (0 to 34 years, 35 to 59 years, and 60 years and older) and gender, in some analyses. The cutoff point of 35 years was chosen based on published RCTs [17, 51] and CPGs [20, 48], which considered a meniscal tear in a patient older than 35 years to be a degenerative injury. The cutoff point of 60 years is an arbitrary value used to represent middle adulthood and older adults. All age groups were assessed to determine whether the medical evidence about the importance of preserving meniscal tissue is applied in the same way in younger and older patients. Other variables included the type of surgery (major outpatient surgery or surgery with hospital admission) and length of stay, in days, for inpatient procedures.

Ethical Approval

Ethical approval was obtained for this study.

Statistical Analysis

First, surgical interventions were accounted for in the healthcare areas of a patient's residence, whether they were performed in hospitals inside or outside that area; therefore, the analysis characterized the surgical experience of the population residing in a specific territory rather than the characteristics of a hospital.

Second, we estimated the standardized rates per 10,000 inhabitants (direct method) using the age and sex of the 2003 Spanish census population as the reference. Therefore, these standardized rates correspond to those each area would have had in the corresponding year if it had the age and gender distribution of the Spanish population of 2003, allowing for comparisons over time (and among areas) regardless of population structure. Because we have no Galicia data for 2016 to 2018, the Galicia population was excluded to estimate 2016 to 2018 rates. Linear regression was used to determine trends in standardized rates over time. Where applicable, a *p* value of < 0.05 was chosen to indicate statistical significance.

Table 1. Arthroscopic meniscectomy in Spain (2003 to 2018) in the entire population, men and women

Parameter	2003	2007	2011	2015	2018 ^a
All					
Procedures	20,384	25,105	27,628	29,618	29,430
Standardized rate	4.8 (4.9 to 5.6)	5.5 (4.6 to 6.3)	5.7 (4.9 to 6.6)	6.1 (5.2 to 7)	6.3 (5.4 to 7.3)
EQ5-95	32.8	21.7	18.6	17.2	11.6
Men					
Procedures	12,353	15,370	17,624	18,516	18,083
Standardized rate	5.9 (4.6 to 7.1)	6.8 (5.4 to 8.1)	7.5 (6 to 8.9)	7.9 (6.4 to 9.4)	8.1 (6.5 to 9.6)
EQ5-95	29.3	18.7	16.6	15.4	8.7
Women					
Procedures	8031	9735	10,004	11,102	11,347
Standardized rate	3.7 (2.7 to 4.7)	4.2 (3.2 to 5.2)	4.1 (3.1 to 5.1)	4.4 (3.3 to 5.4)	4.7 (3.6 to 5.7)
EQ5-95	46.2	33.3	42	22.4	17.4

Values are presented as the mean (95% CI).

^aThe healthcare areas of Galicia are not included. Standardized rate = standardized age-gender rates per 10,000 inhabitants, using the 2003 Spanish census population as the reference; EQ5-95 = extremal quotient 95-5 is the ratio between the standardized rate of arthroscopic meniscectomies of a health area at the 95th percentile and the standardized rate of an area at the 5th percentile. A low value implies low variability among areas and a high value means there are large differences in the indication for this procedure among them.

Third, to analyze variation among healthcare area standardized rates, standard small-area variation statistics were calculated, including the ratio among the healthcare areas in the 5th and 95th percentiles (extremal quotient 5-95 [EQ5-95]), the systematic component of variance (SCV), and the intraclass correlation coefficient (ICC) (Supplemental Table 2; <http://links.lww.com/CORR/A951>). The EQ5-95 is the variation between the highest and lowest value of the standardized rate among healthcare areas at the 95th and 5th percentiles. For example, an EQ5-95 equal to 10 means that the standardized rate in the healthcare areas at the 95th percentile is 10 times higher than those at the 5th percentile, or 900% more. The SCV represents variation in the deviation between the observed and expected rate, expressed as a percentage of the expected rate. The higher the SCV, the greater the variation that is not expected by chance. Finally, the ICC represents part of the variance among healthcare areas that can be explained by variance among the regional National Health System they belong to. The higher the value, the greater the correlation among the different healthcare areas of the same regional healthcare service and the greater the differences among regions.

Results

Overall Use of Arthroscopic Meniscectomy in Spain

After adjusting for changes in the population's age and gender distribution, the standardized rate of arthroscopic

meniscectomy in Spain increased from 4.8 (95% CI 3.9 to 5.6) in 2003 to 6.3 (95% CI 5.4 to 7.3) procedures per 10,000 population in 2018, which represents a 33% increase (Fig. 1). Standardized rates in men increased from 5.9 (95% CI 4.6 to 7.1) in 2003 to 8.1 (95% CI 6.5 to 9.6) in 2018 per 10,000 men. These values were higher than those in women, where the standardized rates increased from 3.7 (95% CI 2.7 to 4.7) in 2003 to 4.7 (95% CI 3.6 to 5.7) in 2018 per 10,000 women (Table 1). Furthermore, men showed a more intense relative increase (37% [2.2 of 5.9]) than women (27% [1 of 3.7]) over the study period (Supplemental Table 2; <http://links.lww.com/CORR/A951>).

The use of arthroscopic meniscectomy was greater in older patients than in patients younger than 35 years (Fig. 2). Standardized rates were higher in the group aged 35 to 59 years (2018: 10 per 10,000; 56% of all procedures throughout the study period), followed by those aged 60 and over (2018: 7 per 10,000; 26% of procedures throughout the period) and those younger than 35 years (2018: 3.2 per 10,000; 18% of all procedures). Standardized rates increased slightly in the age group younger than 35 years (0.06 interventions per 10,000 inhabitants per year [95% CI 0.05 to 0.08]) (Supplemental Table 3; <http://links.lww.com/CORR/A952>), whereas they increased more markedly in the age groups of 35 to 59 years (0.14 interventions per 10,000 inhabitants per year [95% CI 0.11 to 0.17]) (Supplemental Table 4; <http://links.lww.com/CORR/A953>) and in those 60 years and older (0.13 interventions per 10,000 inhabitants per year [95% CI 0.09 to 0.17]) (Supplemental Table 5; <http://links.lww.com/CORR/A954>). Women accounted for 35% (82,788 of

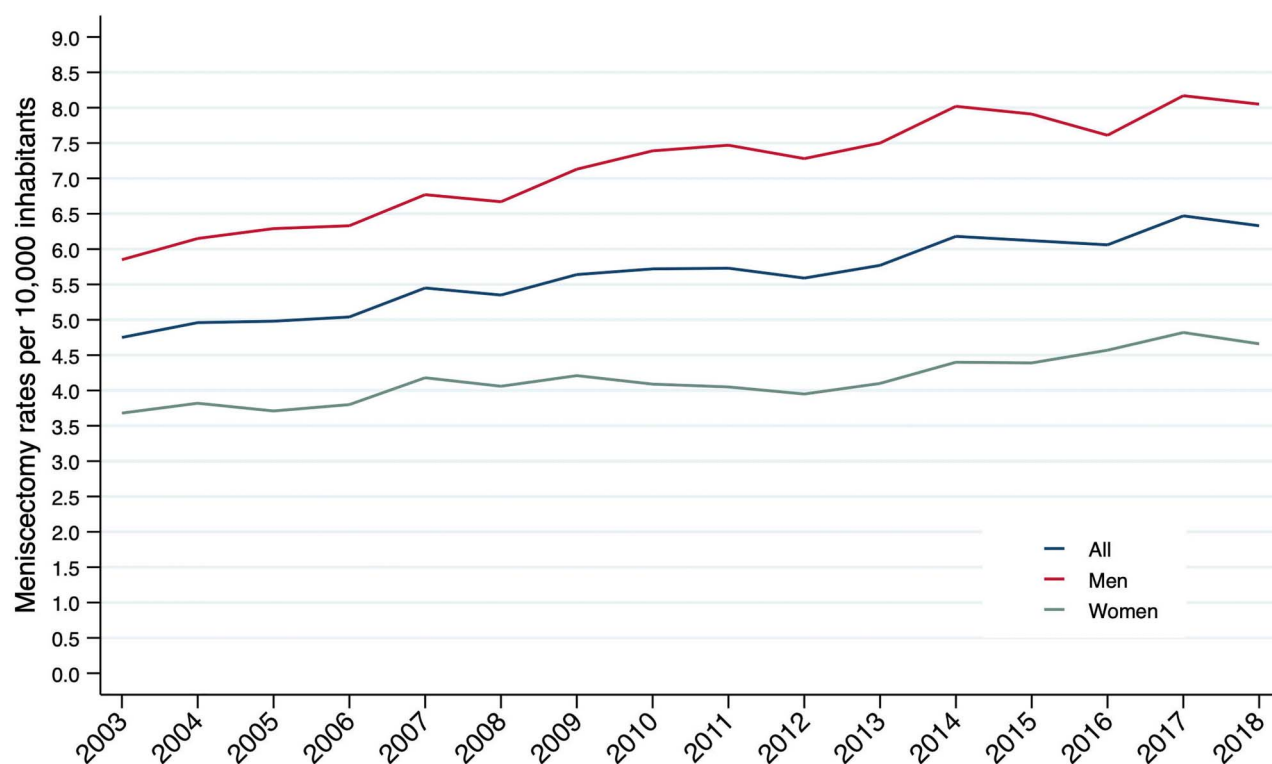


Fig. 1 This graph shows the standardized rate of meniscectomy per 10,000 population in Spain (2003 to 2018) for the entire population and by gender group. A color image accompanies the online version of this article.

235,606) of all procedures in the group aged 35 to 59 years, 21% (15,654 of 75,806) in the group younger than 35 years, and 56% (60,441 of 108,816) in those aged 60 and older. The standardized rates for both sexes increased in all three age groups, more intensely in men aged 60 and older (53% [2.6 of 4.9]) and in women under 35 (45% [0.5 of 1.1]).

Healthcare Area Variation in the Rate of Arthroscopic Meniscectomy

The EQ 5-95 (Table 1) decreased from a nearly 33-fold higher rate difference in the healthcare areas at the 95th percentile relative to healthcare areas at the 5th percentile in 2003 to 12-fold in 2018, indicating a reduction in variability from hospital to hospital. The variability was greater in women (17 times the difference in 2018) than in men (8.7 times the difference). This reduction was also shown in the SCV (from 1.2 in 2003 to 0.7 in 2018), which was also more accentuated in women than in men. The ICC indicated that the regional National Health Service the healthcare areas belonged to explained 45% of the variance among healthcare areas in 2003, and this percentage reduced to 31% in 2018 (Supplemental Table 6; <http://links.lww.com/CORR/A955>).

Navarre, the Basque Country, and Catalonia had the highest rates with respect to the Spanish National Health System mean. Andalusia, the Canary Islands, Extremadura, and Galicia had the lowest rates. None of the regional National Health Services showed a clear downward trend in the past 5 years (Fig. 3).

Outpatient Resource Use for Arthroscopic Meniscectomy

Arthroscopic meniscectomies performed on an outpatient basis accounted for one-third (32% [6544 of 20,384]) of meniscectomies in 2003 and grew to two-thirds (66% [19,600 of 29,618]) in 2015, remaining stable since then. The mean length of stay for inpatient arthroscopic meniscectomies decreased from 2 ± 2.4 days in 2003 to 1.6 ± 1.4 days in 2015, growing again to 1.9 ± 4.4 days in 2018 (Table 2).

Discussion

Very strong evidence from RCTs has found that arthroscopic meniscectomy in middle-aged and older adults is not superior to sham (placebo) surgery or physical therapy [48]. Knowing whether this evidence has resulted in

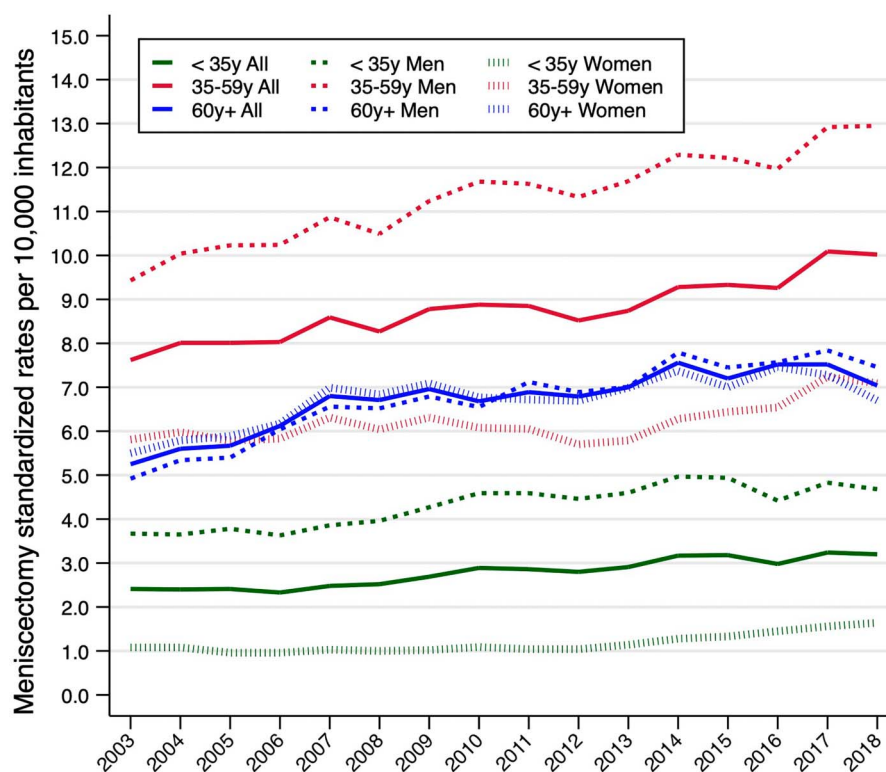


Fig. 2 This graph shows the standardized rate of meniscectomy by age and gender group in Spain (2003 to 2018). A color image accompanies the online version of this article.

changes to clinical practice is of great importance both for the wellbeing of patients who may be exposed to ineffective surgical treatments and for an assessment of the need to implement educational and practice-based strategies to reverse inappropriate use of invasive procedures. Here, we used a large national database to evaluate variation in the use of arthroscopic meniscectomy over a period of 15 years. From 2003 to 2018, a gradual and constant increase in the rate of these procedures was observed, indicating that many patients have received interventions that are not supported by robust evidence.

Limitations

This study had several limitations. The data came from a national database that included the activity of public hospitals and hospitals with public-private partnerships. Although the Spanish National Health System provides universal and free healthcare to the entire population in Spain, there is a parallel network of private hospitals. Therefore, the described arthroscopy rates may be underestimated. Between 2003 and 2015, procedures were coded according to ICD-9-CM and from 2016 onward with the ICD-10-ES. These classifications differ substantially, and in the transition from one system to another, there might

have been mismatches in allocation. However, the national registry is periodically audited; thus, errors are minimized. Another limitation is that we did not collect the rate of meniscal repairs, which is a routine practice in our country when a repairable tear is found. Nevertheless, this does not invalidate our findings because we observed an increase in the rate of meniscectomy, and the percentage of repairable tears is low, especially in older patients. We did not include clinical data such as the presence of osteoarthritis or degenerative or traumatic meniscal tears. Similarly, we do not believe this invalidates our results because we observed an increase, and an epidemiologic change in the incidence of these conditions in recent years is unlikely. Finally, we selected procedures for inclusion based on the intervention that was performed, which is reflected by the surgeon in the clinical record; on a few occasions, it may not have been completely performed. All hospitals in Spain have a service of specialists in medical documentation who supervise and codify the intervention performed and the discharge report so that errors might have been reduced.

Overall Use of Arthroscopic Meniscectomy in Spain

After adjusting for changes in the population's age and gender distribution, the standardized rate of arthroscopic

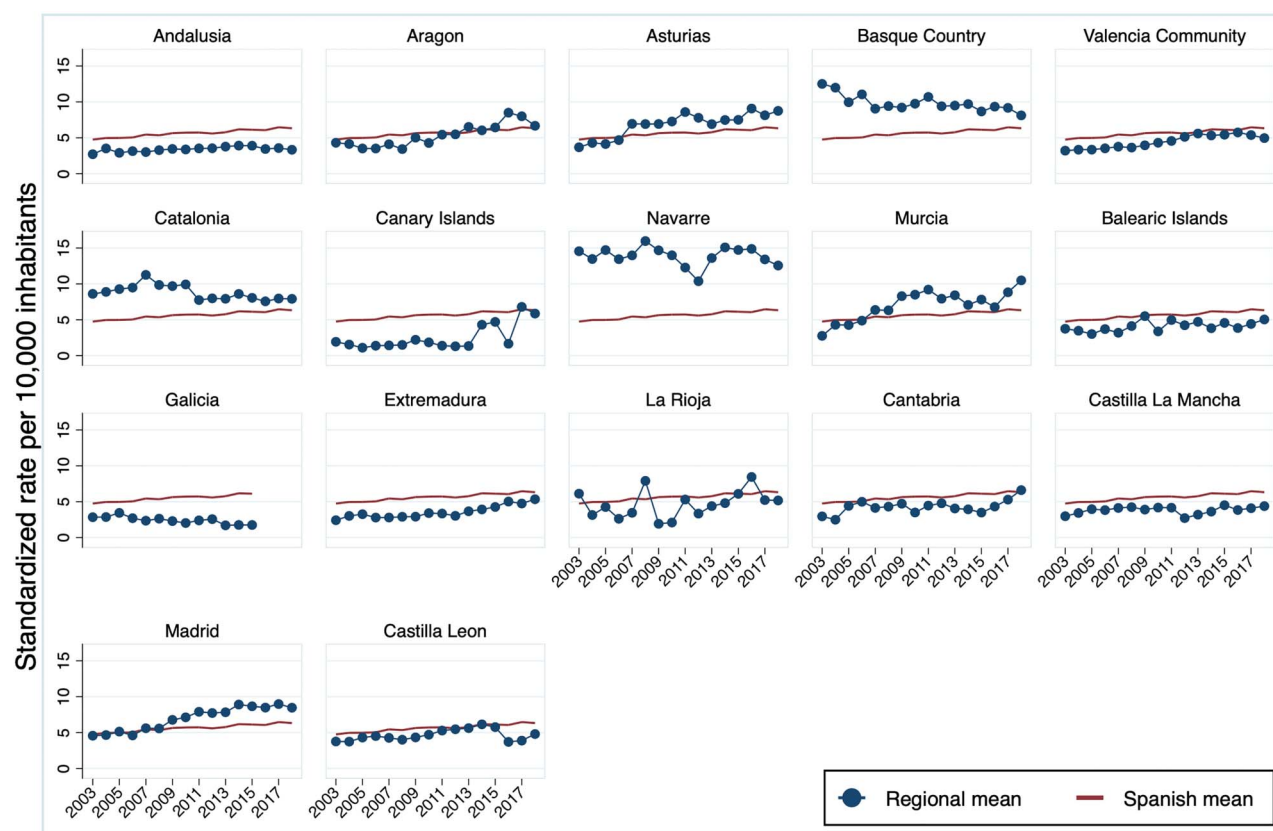


Fig. 3 These graphs show the standardized rate of meniscectomy in the regional health services in Spain and in the Spanish National Health System (2003 to 2018).

meniscectomy in Spain increased considerably over the 15-year timespan of this study, suggesting a mismatch between actual clinical practice and evidence-based recommendations. These findings are consistent with the results of large-sample studies in other countries that also showed an increase in the rate of meniscectomies in recent years [8, 16, 18, 31, 54] but contrast with others that showed a decrease [1, 12, 21-23, 29, 33, 37, 47]. This has been particularly evident since the publication of a seminal RCT [51] showing no benefit of arthroscopic meniscectomy over simulated surgery or physiotherapy in patients older than 35 years. Medical reversal is defined as occurring when an established and common medical practice is

abandoned because new research shows it to be either ineffective or harmful [44]. The differences in rates and trends in arthroscopic meniscectomies among countries are multifactorial, and surely they are modulated by the characteristics of each healthcare system, as well as by variations in the actions taken by healthcare managers to reduce variability. McCulloch et al. [34], in a review of strategies to reduce variation in the use of surgery, distinguished between microlevel interventions that target clinicians' decision-making (such as guidelines, dissemination, or feedback) and macrolevel interventions that target health systems using financial, regulatory, or incentive-driven strategies. Similarly, Essilfie et al. [12] studied the Humana

Table 2. Outpatient and inpatient meniscectomy in Spain, 2003 to 2018

Parameter	2003 (n = 20,384)	2007 (n = 25,105)	2011 (n = 27,628)	2015 (n = 29,618)	2018 ^a (n = 29,430)
LOS in days, mean ± SD	2 ± 2.4	1.7 ± 2.3	1.6 ± 1.4	1.6 ± 2.3	1.9 ± 4.4
Procedures performed as an outpatient, % (n)	32 (6544)	43 (10,897)	52% (14,321)	66 (19,600)	67 (19,573)

^aThe healthcare areas of Galicia are not included. LOS = length of stay for inpatient procedures.

database in the United States between 2007 to 2015 and found a reduction in the rate of arthroscopic meniscectomies, which they attributed to media attention on the findings of recent RCTs as well as changes in insurance authorization protocols. Similarly, Holtedahl et al. [21] observed a 36% reduction in the rate of meniscectomies in Norway between 2012 to 2016 that was associated with bidding restrictions imposed by health authorities. Additionally, financial incentives appear to influence surgical decision-making in knee arthroscopy, especially in private practice [18, 21, 37]. The Spanish National Health System seems to be protected from economic incentives because there is no fee-for-service payment but salaried employees. In fact, the small incentives that physicians may receive go in the opposite direction, because they are rewarded for reducing waiting lists and health outcomes such as readmissions or complications. Therefore, medical decisions might be more influenced by other factors such as the knowledge clinicians have or how they acquire it [41].

Some of the sources of knowledge used by clinicians in our country are CPGs and protocols prepared by experts and specialized societies. However, several scientific societies and opinion leaders are reluctant to change, and they do not fully adhere to new evidence, even when it is of high quality. For example, the American Academy of Orthopedic Surgeons; International Society of Arthroscopy, Knee Surgery, and Orthopaedic Sports Medicine; and European Society for Sports Traumatology, Knee Surgery, and Arthroscopy CPGs, as well as a Delphi consensus of 20 experts, continue to recommend meniscectomy in degenerative meniscal tears in patients in whom symptoms persist despite nonsurgical treatment for 3 months, or if there are mechanical symptoms [2, 3, 20, 52]. These documents, which reflect a generalized opinion rather than research data, might act as barriers to medical reversal because they are highly accepted and accredited in the orthopaedic community of our country. Some authoritative voices have been raised against inconsistent recommendations that are not supported by evidence [30, 45] because they are recommending an ineffective intervention as a second line of treatment. The RCTs [13, 51] that showed the ineffectiveness of meniscectomy had inclusion criteria that mandated the presence of persistent symptoms despite nonsurgical management; this suggests that arthroscopic meniscectomy is ineffective in situations in which it is being recommended by some experts and CPGs. Furthermore, a post hoc analysis in an RCT by Sihvonen et al. [51] and a prospective study [43] did not find any benefit of meniscectomy in subgroups of patients with mechanical symptoms such as catching or occasional locking, symptom onset, or duration of symptoms [49, 50] or a difference in results between traumatic and degenerative tears [53]. A secondary analysis of another RCT also failed to find baseline variables to predict clinically relevant improvement in patients with a degenerative meniscus tear [38].

The standardized rates throughout the studied time period were higher in the group aged 35 to 59 years, followed by those aged 60 and over, with those under 35 having the lowest rate. These findings are consistent with findings from studies in other countries that reported a higher percentage of meniscectomies in the 35-year to 60-year age range [21, 26, 47, 54], even in countries reporting a decline. Thus, the average age of patients undergoing meniscectomy was 52 years in Finland [33] and 49 years in the United Kingdom [1], for example. Regarding the growing trend in meniscectomy rates observed in Spain, the groups of patients aged 35 to 59 years and over 60 years were those who experienced the greatest increase. This increase, especially in those older than 60 years (in which the tears were almost certainly degenerative), indicates a mismatch between clinical practice and evidence that has demonstrated the uselessness of these interventions.

Healthcare Area Variation in the Rate of Arthroscopic Meniscectomy

Interestingly, we found a decrease in variability among healthcare areas, parallel to the increase in the rate of arthroscopic meniscectomies. That is, the different Spanish hospitals progressively tended toward a consensus to indicate more meniscectomies, moving away from what is recommended by the evidence. One cause of increased medical variability is conflicting evidence or controversy about the actual efficacy of a treatment. Variation in medical practice tends to increase when there is no strong evidence on which treatment is the most appropriate, and variation tends to decrease when the evidence is strong [34, 42]. Surprisingly, in our study, we observed a reduction in variability but in the direction of the inappropriate procedure. This suggests either deficient dissemination or low levels of acceptance of the new knowledge. In other countries where there has been a decrease in the meniscectomy rate, this decrease has been accompanied by an increase in variability among regions, with more menisci being treated in some regions and less in others because of the impact of different health measures implemented in each region [1, 12, 21, 23]. The findings observed in our series alert us to the urgent need to promote and disseminate evidence-based CPGs in our country.

Outpatient Resource Use for Arthroscopic Meniscectomy

In our study, we observed an increase in the percentage of arthroscopic meniscectomies performed in outpatient settings, with a corresponding reduction in hospital admissions. This change in the use of ambulatory surgery in knee arthroscopy is global [28]. At first, the increase in the

availability of outpatient surgery for arthroscopic meniscectomy could have acted as a facilitator that explains—at least in part—the increase in the meniscectomy rate. However, the impact of the increased resource availability appears to be small, because the ambulatory rate has remained constant since 2014, while the meniscectomy rate continued to increase after that year. This finding is consistent with that reported in Switzerland, where most arthroscopic meniscectomies are performed on an inpatient basis, also noting an increase in meniscectomy rates [37].

Conclusion

We observed a progressive increase in the use of arthroscopic meniscectomy in Spain; this procedure was more common in older patients, who are likely to have degenerative tears. This increase occurred despite a considerable amount of high-level evidence showing a lack of benefit of meniscectomy compared with other less invasive treatments in middle-aged and older people. Our study highlights the need for action by healthcare systems, perhaps including the use of financial, regulatory, or incentive strategies to reduce the use of low-value procedures, as well as interventions to disseminate the existing evidence to clinicians and patients. New studies are needed to identify existing barriers to medical reversal and how best to remove them.

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Acknowledgment We thank Dr. María José Sangüesa for her advice in this study.

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