

# Does Ethnicity or Gender Have an Impact on Medication Consumption after Arthroscopic Partial Meniscectomy?

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**ABSTRACT** **Background:** Pain following arthroscopic partial meniscectomy (APM) varies considerably among patients. Previous studies have suggested that gender and ethnicity may influence postoperative pain after orthopedic procedures. However, limited evidence exists regarding pain differences between Arab and Jewish patients after APM.

**Objectives:** To evaluate the association of gender and ethnicity with postoperative pain and analgesic consumption during the first month after APM.

**Methods:** Patients who underwent primary APM between 2018 and 2019 were retrospectively identified and stratified by gender and ethnicity. Intraoperative findings, including meniscal tear type and cartilage injury, were recorded. Postoperative pain was assessed using the Knee injury and Osteoarthritis Outcome Score (KOOS), analgesic consumption was quantified in grams, and pain sensitivity was evaluated with the Pain Sensitivity Questionnaire (PSQ). Outcomes were analyzed weekly during the first postoperative month.

**Results:** In total, 99 patients were included (65 men, 34 women; 39 Arabs, 60 Jews), comprising 22 Arab men, 43 Jewish men, 17 Arab women, and 17 Jewish women. Women reported lower KOOS scores and consumed more analgesics during weeks 3 and 4. Arab patients also demonstrated lower KOOS scores, higher PSQ scores, and greater analgesic consumption at selected postoperative intervals. Combined analysis showed an additive effect of gender and ethnicity, with Arab women reporting the poorest pain outcomes.

**Conclusions:** Female gender and Arab ethnicity were associated with greater postoperative pain and increased analgesic requirements after APM. These factors should be considered when tailoring postoperative pain management, although baseline differences and cultural influences may partially explain the associations.

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**KEY WORDS:** arthroscopy, ethnicity, gender, meniscectomy, pain

Postoperative pain control after arthroscopic partial meniscectomy (APM) is essential to enhance recovery and early return to daily activities. Patients vary regarding pain level and number of analgesics required for adequate pain relief [1-3].

When reviewing the literature, we found few studies published data on gender as a predictor of APM outcome. Studies have found lower functionality and higher pain level for women [4,5], while others had not found such correlations [6,7]. Most of these studies reported functional outcome at 12 months with one reporting Knee injury and Osteoarthritis Outcome Score (KOOS) results at 3 months. Hence, there is a lack of data about gender influence on the immediate postoperative pain experience. A study on immediate pain after maxillofacial surgery showed that women had more pain and consumed more opiates [8].

Factors proposed as direct mediators of pain differences between races include fear of medication and side effects, healthcare communication, and access to medical services. Ethnicity entails culture, faith, educational levels, and social factors, may have an impact on patient attitude toward medications and pain perception [9]. The socioecological model predicts the multifactorial nature of individual pain management [10] and the relevance of numerous other factors.

High quality studies about ethnicity and surgical pain are sparse. We found only one study that evaluated ethnicity and APM and did not find differences between white and black populations at the 3-month follow-up [11].

A meta-analysis published in 2019 [12] reported that minorities of African American and Hispanic descents had higher immediate postoperative pain after tonsillectomy, knee arthroplasty, and spine surgery. Most studies on ethnicity and pain examined black, white, Hispanic, and Asian populations and reported outcome at 12 months [9,12-14].

Greenwald and colleagues [15] examined pain differences among several ethnicities, including Jews, in the United States and found that ethnicity influenced the affective terms used to describe pain in the questionnaire.

Few studies have examined pain variation among Arabs and Jews living in Israel. Gepstein et al. [16] performed a case-control study in patients undergoing lumbar spine surgery and found the same pain levels at a mean follow-up of 45 months. They did, however, find a difference in baseline preoperative pain and disability levels.

Another study examined pain variation in Arabs and Jews in Israel after a whiplash injury and demonstrated lower medication administration to Jews despite comparable pain level [17].

Shavit et al. [18] studied pediatric fractures and dislocations in an Israeli emergency department (ED) and found no differences in opioid consumption based on ethnicity. Their strict pain management protocol adherence was hypothesized to prevent biased treatment. There was also no difference in the Visual Analogue Scale (VAS) score at arrival.

Currently, to the best of our knowledge, there is no similar data on Israeli ethnic groups and pain level after APM.

The purpose of this study was to evaluate the possible correlation of gender and ethnicity to immediate postoperative pain and medication consumption after APM in the Israeli population. The hypothesis was that women would experience more pain and that the effect of ethnicity is dependent on gender: Arab men would experience less pain than Jewish men, while Arab women would experience more pain than Jewish women.

## STUDY OBJECTIVES

The objective of our research was to evaluate the possible correlation of gender and ethnicity to pain level in the subacute period after APM.

## PATIENTS AND METHODS

Data were collected retrospectively from the Arthroscopic Surgery Unit's archive about patients who were operated in the years 2018–2019. Patient medical charts were reviewed for demographics, medical history, preoperative function, functional and pain questionnaires, and intraoperative findings. Patient ethnicity was classified as Arab or Jew according to their self-definition and native language. The Charlson Comorbidity Index (CCI) was calculated and reported. The CCI is a tool to evaluate a patient's level of co-morbidity and predicts the 10-year survival rate [19].

Inclusion criteria were patients who underwent APM surgery, were older than 18 years of age, had knee symptoms lasting at least 3 months, and had follow-up data existing from the first month after the surgery. Patients with concomitant ligamentous injuries were excluded. In total, 99 patients were included in this retrospective cohort analysis.

Preoperative patient data included patient details, ethnicity, patient history, Tegner score [20], KOOS pain subscale score, pain sensitivity questionnaire (PSQ) score, and VAS score [Table 1].

All patients went through APM under general anesthesia in the supine position using a leg holder and tourniquet. None of the patients had a nerve block perioperatively. Diagnostic arthroscopy documented all intraarticular findings before meniscal intervention. Torn menisci were trimmed to a stable rim. At discharge, patients were instructed to start gradual self-rehabilitation illustrated in printed exercise programs.

Perioperative data that was collected [Table 1] included cartilage damage graded according to the International Cartilage Repair Society (ICRS), which is an acceptable grading system for articular lesions based on lesion depth inspected at arthroscopy, meniscal tear characteristics, and pain management protocol administered to the patient at discharge. Protocol was assigned by the treating surgeon and included intraarticular steroid injection at the end of the procedure, nonsteroidal anti-inflammatory drugs (NSAIDs) daily for a week, or analgesics only as needed. All patients had paracetamol and tramadol prescribed as rescue analgesics.

Postoperative data collection included pain questionnaires and analgesics consumption in the first month of follow-up. Pain was assessed by the KOOS pain subscale and VAS, while medication consumption was assessed by the amount consumed in grams per week.

A multivariable analysis was performed to identify independent factors associated with the PSQ total score (PSQ\_total). PSQ\_total was treated as a continuous dependent variable.

Initially, univariable analyses were conducted to evaluate associations between PSQ\_total and baseline variables, including demographic factors (age, gender, ethnicity), clinical characteristics (body mass index [BMI], CCI), and preoperative measures. Variables demonstrating clinical relevance or a univariable association at  $P < 0.10$  were considered for inclusion in the multivariable model.

A general linear model (GLM) was constructed using PSQ\_total as the outcome variable. The following

**Table 1.** Patient preoperative and postoperative characteristics, analysis of four groups (gender and ethnicity)

| Variable                                  | All               | Men-Arab          | Men-Jewish      | Women-Arab      | Women-Jewish    | P-value |
|-------------------------------------------|-------------------|-------------------|-----------------|-----------------|-----------------|---------|
| Number                                    | 99                | 22                | 43              | 17              | 17              |         |
| Smoking: yes/no                           | 21/23             | 5/5               | 12/9            | 1/5             | 3/4             | 0.41    |
| Knee side: right/left                     | 49/49             | 11/11             | 22/20           | 8/9             | 8/9             | 0.98    |
| Trauma: yes/no                            | 43/55             | 10/12             | 22/20           | 5/12            | 6/11            | 0.38    |
| Marital status: m/s/d                     | 33/37/5           | 9/2/0             | 14/4/3          | 6/0/0           | 4/1/2           | 0.5     |
| Meniscal tear: L/M/ML/N                   | 5/75/11/8         | 1/16/4/1          | 1/33/5/4        | 0/14/1/2        | 3/12/1/1        | 0.56    |
| Tear type: BHT/C/R/S/NO                   | 11/50/27/3/8      | 3/12/5/1/1        | 8/17/13/1/4     | 0/9/5/1/2       | 0/12/4/0/1      | 0.47    |
| Pain protocol: steroid/NSAIDs/SOS         | 32/29/37          | 7/6/9             | 11/15/16        | 7/6/4           | 7/2/8           | 0.48    |
| Age, mean $\pm$ SD                        | 47.37 $\pm$ 12.52 | 39.53 $\pm$ 11.59 | 46.8 $\pm$ 13.7 | 52.53 $\pm$ 5.1 | 53.6 $\pm$ 10.3 | 0.0009  |
| BMI, mean $\pm$ SD                        | 26 $\pm$ 28.0     | 24 $\pm$ 27.7     | 27 $\pm$ 27.3   | 26 $\pm$ 30.8   | 27 $\pm$ 28.3   | 0.24    |
| Charlson Comorbidity Index, mean $\pm$ SD | 0.22 $\pm$ 0.55   | 0.27 $\pm$ 0.63   | 0.14 $\pm$ 0.41 | 0.41 $\pm$ 0.8  | 0.18 $\pm$ 0.39 | 0.61    |
| Tegner, mean $\pm$ SD                     | 4.06 $\pm$ 1.95   | 4.14 $\pm$ 1.67   | 4.71 $\pm$ 1.93 | 2.38 $\pm$ 1.15 | 3.94 $\pm$ 2.08 | 0.0006  |
| Chronicity (months), mean $\pm$ SD        | 13 $\pm$ 15       | 9 $\pm$ 8.8       | 14.1 $\pm$ 17.4 | 19.7 $\pm$ 19.9 | 9.0 $\pm$ 2.7   | 0.012   |
| ICRS, mean $\pm$ SD                       | 1.6 $\pm$ 1.56    | 0.77 $\pm$ 1.23   | 1.39 $\pm$ 1.58 | 2.59 $\pm$ 1.37 | 2.18 $\pm$ 1.42 | 0.0012  |

Marital status: m = married, s = single, d = divorced

Meniscal tear: L = lateral, M = medial, ML = medial and lateral, N = no meniscal tear

Tear type: BHT = bucket handle tear, C = compound, R = radial, S = root, NO = no tear

Pain protocol: steroid = steroid injection intraoperative, NSAIDs (nonsteroidal anti-inflammatory drugs) = celecoxib prescription, SOS = analgesics only as needed

BMI = body mass index, ICRS = International Cartilage Repair Society score, SD = standard deviation

covariates were included in the final model: age (continuous), gender (men/women), ethnicity (Arab/Jewish), BMI (continuous), and CCI (continuous).

Model assumptions (linearity, homoscedasticity, and normality of residuals) were assessed and deemed acceptable. Results are presented as regression coefficients with corresponding *P*-values. Statistical significance was defined as *P* < 0.05.

## STATISTICS

Baseline differences between any two groups were assessed by Fisher's test for categorical variables and Wilcoxon for most continuous variables. PSQ score and BMI were analyzed by *t*-tests. For differences between the four groups, a Kruskal-Wallis test was used for most continuous variables, while ANOVA was used for PSQ and BMI. A minimal change of 8 points is considered clinically significant for the KOOS pain score. An 8-point change was used as the cutoff indicating recovery. The enrollment of 30 participants per group (considering dropouts) was estimated to provide a power of

80% to detect a between-group difference of 8 points in the KOOS pain score, with a type 1 error rate of 5%. A *P*-value > 0.05 was considered statistically significant.

## RESULTS

Of the 102 patients who met the inclusion criteria, 3 were lost to follow-up and were excluded. A cohort of 99 patients was analyzed according to gender or ethnicity. Analysis was performed in the following ways: binary division by gender, binary division by ethnicity, and 4-group division by gender and ethnicity. Table 1 shows the baseline characteristics of the different groups. Some baseline differences were statistically significant.

### PREOPERATIVE ANALYSIS BY GENDER

Women's mean age was 9 years older. Women had lower Tegner scores, longer symptoms before surgery, lower KOOS-pain subscale scores preoperatively, and more severe cartilage damage intraoperatively.

**Table 2.** Preoperative and postoperative KOOS pain scores, analysis of four group analysis (gender and ethnicity)

| Measure                           | All                   | Men-Arab              | Men-Jewish            | Women-Arab           | Women-Jewish          | P-value |
|-----------------------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------|
| Number                            | 99                    | 22                    | 43                    | 17                   | 17                    |         |
| VAS; n, mean $\pm$ SD             | 58, 3.38 $\pm$ 2.47   | 15, 3.53 $\pm$ 2.56   | 27, 3.15 $\pm$ 2.49   | 17, 4.57 $\pm$ 2.44  | 9, 2.89 $\pm$ 2.37    | 0.52    |
| PSQ total; n, mean $\pm$ SD       | 75, 5.08 $\pm$ 1.72   | 15, 5.25 $\pm$ 1.68   | 35, 4.63 $\pm$ 1.64   | 13, 6.57 $\pm$ 1.58  | 12, 4.61 $\pm$ 1.38   | 0.004   |
| KOOS-pain preop; mean $\pm$ SD    | 52.12 $\pm$ 16.11     | 50 $\pm$ 10.43        | 58.76 $\pm$ 15.52     | 39.31 $\pm$ 15.68    | 48.96 $\pm$ 16.51     | 0.0017  |
| KOOS-pain POD7; n, mean $\pm$ SD  | 62, 69.38 $\pm$ 16.14 | 11, 72.22 $\pm$ 13.61 | 30, 72.05 $\pm$ 14.11 | 9, 57.14 $\pm$ 20.52 | 12, 68.25 $\pm$ 17.95 | 0.25    |
| KOOS-pain POD14; n, mean $\pm$ SD | 69, 69.52 $\pm$ 18.34 | 16, 60.59 $\pm$ 22.34 | 34, 76.02 $\pm$ 13.01 | 7, 60.32 $\pm$ 17.55 | 12, 66.38 $\pm$ 20.5  | 0.039   |
| KOOS-pain POD21; n, mean $\pm$ SD | 60, 69.89 $\pm$ 16.27 | 15, 67.36 $\pm$ 11.83 | 29, 70.59 $\pm$ 17.43 | 7, 58.33 $\pm$ 15.77 | 9, 62.59 $\pm$ 8.92   | 0.0068  |
| KOOS-pain 1M; n, mean $\pm$ SD    | 61, 74.72 $\pm$ 16.6  | 14, 78.77 $\pm$ 16.54 | 25, 76.99 $\pm$ 16.17 | 9, 64.5 $\pm$ 11.37  | 13, 73.06 $\pm$ 18.85 | 0.064   |

KOOS = Knee Injury and Osteoarthritis Outcome Score, PSQ = Pain Sensitivity Questionnaire, POD = postoperative day, VAS = Visual Analogue Scale, SD = standard deviation

### PREOPERATIVE ANALYSIS BY ETHNICITY

Arabs had lower Tegner scores, lower KOOS-pain subscale scores preoperatively, and higher PSQ scores, which indicates higher sensitivity to pain.

### POSTOPERATIVE ANALYSIS BY GENDER

Women had 13.61 lower KOOS-pain scores at POD21 (higher pain) but not on POD7 or POD14. At the first clinic follow-up, women had 8.06 lower KOOS pain scores [Table 2]. Regarding analgesics, women consumed more acetaminophen and dipyron than men during the third week after the surgery [Table 3]. They also consumed more etodolac during the second week but otherwise had no significant difference in the first month and with other agents (tramadol, ibuprofen).

### POSTOPERATIVE ANALYSIS BY ETHNICITY

Arabs scores were 10.4 points lower on KOOS pain preoperative measures (higher pain). Arabs also had a score that was 13.52 lower for KOOS pain in POD14 and 8.87 lower in POD21 scores. The score on POD7 had the same trend but was not significant. At clinic follow-up there was no difference.

Regarding analgesics, Arabs consumed 2.7 grams more acetaminophen during the first week after surgery, 1.8 grams more acetaminophen during the second week after surgery, and 1.79 grams more tramadol during the fourth week after surgery. Other OTC analgesics consumption did not differ between the groups [Table 4].

### POSTOPERATIVE ANALYSIS BY 4 GROUPS (GENDER AND ETHNICITY)

Significant inter-group differences were noted for POD14 KOOS pain subscale score with a maximum difference of 15.7 points between Jewish men (76.02) and Arab women (60.32), and for POD21 KOOS-pain subscale score with a maximum difference of 20.04 points between the same groups. As for medication consumption, Arab women consumed the most acetaminophen during week 1 (3.56 grams) and week 2 (3.89 grams), while Jewish men consumed the least amount (0 grams).

The same result was noted in dipyron consumption during the third week after surgery. Other analgesics (tramadol, NSAIDs) showed no significant difference. A total of 75 patients with available PSQ total data were included in the multivariable analysis. In the univariable analysis, ethnicity was significantly associated with PSQ total, with higher scores observed among Arab patients compared to Jewish patients (mean 5.84 vs. 4.62,  $P = 0.0023$ ).

In the multivariable linear regression model, ethnicity remained an independent predictor of PSQ total. After adjustment for age, gender, BMI, and CCI scores, Arab ethnicity was associated with higher PSQ scores (least squares mean) mean 5.78 vs. 4.32;  $P = 0.0119$ ).

Age demonstrated a trend toward association with PSQ total but did not reach statistical significance ( $P = 0.0805$ ). No significant associations were observed for gender ( $P = 0.6614$ ), BMI ( $P = 0.7933$ ), or Charlson Comorbidity Index ( $P = 0.1867$ ).

**Table 3.** Postoperative acetaminophen and tramadol cumulative consumption, analysis of four groups (gender and ethnicity)

| Value                              | All                 | Men-Arab            | Men-Jewish          | Women-Arab         | Women-Jewish        | P-value |
|------------------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------|
| Number                             | 71                  | 12                  | 43                  | 17                 | 17                  |         |
| POD7-ACET-grams; n, mean $\pm$ SD  | 71, 1.21 $\pm$ 2.93 | 16, 2.63 $\pm$ 3.48 | 33, 0 $\pm$ 0       | 9, 3.56 $\pm$ 4.42 | 13, 0.92 $\pm$ 3.33 | 0.0001  |
| POD7-TRAM-grams; n, mean $\pm$ SD  | 71, 1.65 $\pm$ 4.01 | 16, 2.13 $\pm$ 3.96 | 33, 1 $\pm$ 0.3     | 9, 3.11 $\pm$ 4.81 | 13, 1.69 $\pm$ 4.31 | 0.3     |
| POD14-ACET-grams; n, mean $\pm$ SD | 75, 0.88 $\pm$ 3.63 | 16, 1.06 $\pm$ 3.49 | 36, 0 $\pm$ 0       | 9, 3.89 $\pm$ 7.91 | 14, 1 $\pm$ 0.3.74  | 0.044   |
| POD14-TRAM-grams; n, mean $\pm$ SD | 75, 1.41 $\pm$ 4.07 | 16, 1.63 $\pm$ 3.65 | 36, 0.86 $\pm$ 2.79 | 9, 5.44 $\pm$ 8.41 | 14, 0 $\pm$ 0       | 0.11    |
| POD21-ACET-grams; n, mean $\pm$ SD | 69, 1.81 $\pm$ 6.7  | 16, 0.88 $\pm$ 3.5  | 32, 0.97 $\pm$ 4.06 | 8, 1.25 $\pm$ 2.19 | 13, 5.38 $\pm$ 13.3 | 0.12    |
| POD21-TRAM-grams; n, mean $\pm$ SD | 68, 1.4 $\pm$ 5.27  | 16, 0.44 $\pm$ 1.75 | 32, 1.09 $\pm$ 4.39 | 7, 0.43 $\pm$ 1.13 | 13, 3.85 $\pm$ 9.61 | 0.7     |
| POD28-ACET-grams; n, mean $\pm$ SD | 41, 0.68 $\pm$ 4.37 | 9, 3.11 $\pm$ 9.33  | 17, 0 $\pm$ 0       | 6, 0 $\pm$ 0       | 9, 0 $\pm$ 0        | 0.3     |
| POD28-TRAM-grams; n, mean $\pm$ SD | 40, 0.63 $\pm$ 2.51 | 9, 2.33 $\pm$ 4.95  | 17, 0 $\pm$ 0       | 5, 0.8 $\pm$ 1.79  | 9, 0 $\pm$ 0        | 0.11    |

ACET = acetaminophen, POD = postoperative day, TRAM=tramadol, SD = standard deviation

**Table 4.** Postoperative over-the-counter analgesic cumulative consumption (dipyrone, ibuprofen, etodolac), analysis of four groups (gender and ethnicity)

| Variable                           | All                 | Men-Arab            | Men-Jewish          | Women-Arab         | Women-Jewish        | P-value |
|------------------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------|
| Number                             | 99                  | 22                  | 43                  | 17                 | 17                  |         |
| POD7-DIPY-grams; n, mean $\pm$ SD  | 71, 0.79 $\pm$ 3.34 | 16, 0.25 $\pm$ 1    | 33, 0.67 $\pm$ 3.49 | 9, 1.33 $\pm$ 4    | 13, 1.38 $\pm$ 4.43 | 0.75    |
| POD7-IBUF-grams; n, mean $\pm$ SD  | 71, 0.28 $\pm$ 1.36 | 16, 0 $\pm$ 0       | 33, 0.36 $\pm$ 1.45 | 9, 0 $\pm$ 0       | 13, 0.62 $\pm$ 2.22 | 0.62    |
| POD7-ETOP-grams; n, mean $\pm$ SD  | 71, 1.54 $\pm$ 3.53 | 16, 1.25 $\pm$ 2.82 | 33, 1.06 $\pm$ 2.5  | 9, 1.78 $\pm$ 3.53 | 13, 2.92 $\pm$ 5.92 | 0.75    |
| POD14-DIPY-grams; n, mean $\pm$ SD | 75, 0.99 $\pm$ 3.45 | 16, 0.13 $\pm$ 0.5  | 36, 0.64 $\pm$ 2.54 | 9, 3.11 $\pm$ 6.88 | 14, 1.5 $\pm$ 4.05  | 0.16    |
| POD14-IBUF-grams; n, mean $\pm$ SD | 75, 0.08 $\pm$ 0.51 | 16, 0 $\pm$ 0       | 36, 0.17 $\pm$ 0.74 | 9, 0 $\pm$ 0       | 14, 0 $\pm$ 0       | 0.53    |
| POD14-ETOP-grams; n, mean $\pm$ SD | 75, 1.21 $\pm$ 3.49 | 16, 1.38 $\pm$ 3.91 | 36, 0.56 $\pm$ 2.51 | 9, 2.89 $\pm$ 4.94 | 14, 1.64 $\pm$ 4.03 | 0.14    |
| POD21-DIPY-grams; n, mean $\pm$ SD | 68, 0.81 $\pm$ 3.45 | 16, 0 $\pm$ 0       | 32, 0.03 $\pm$ 0.18 | 7, 3.43 $\pm$ 7.79 | 13, 2.31 $\pm$ 5.22 | 0.0029  |
| POD21-IBUF-grams; n, mean $\pm$ SD | 69, 0.49 $\pm$ 2.8  | 16, 0.94 $\pm$ 3.75 | 32, 0 $\pm$ 0       | 8, 0 $\pm$ 0       | 13, 1.46 $\pm$ 4.98 | 0.12    |
| POD21-ETOP-grams; n, mean $\pm$ SD | 69, 1.2 $\pm$ 3.92  | 16, 1.5 $\pm$ 4.16  | 32, 0.91 $\pm$ 3.44 | 8, 1.25 $\pm$ 2.43 | 13, 1.54 $\pm$ 5.55 | 0.26    |
| POD28-DIPY-grams; n, mean $\pm$ SD | 40, 1.1 $\pm$ 5.18  | 9, 3.33 $\pm$ 10    | 17, 0 $\pm$ 0       | 5, 0 $\pm$ 0       | 9, 1.56 $\pm$ 4.67  | 0.47    |
| POD28-IBUF-grams; n, mean $\pm$ SD | 41, 0 $\pm$ 0       | 9, 0 $\pm$ 0        | 17, 0 $\pm$ 0       | 6, 0 $\pm$ 0       | 9, 0 $\pm$ 0        | 1       |
| POD28-ETOP-grams; n, mean $\pm$ SD | 41, 0.07 $\pm$ 0.47 | 9, 0 $\pm$ 0        | 17, 0 $\pm$ 0       | 6, 0.5 $\pm$ 1.22  | 9, 0 $\pm$ 0        | 0.12    |

DIPY = dipyrone, ETOP = etodolac, IBUF = ibuprofen, POD = postoperative day

The overall model showed borderline statistical significance ( $F = 2.39$ ,  $P = 0.0554$ ) and explained approximately 23.4% of the variance in PSQ total ( $R^2 = 0.234$ ).

Ethnicity was the only independent predictor of pain sensitivity in this cohort, with Arab patients demonstrating significantly higher PSQ scores after adjustment for potential confounders.

## DISCUSSION

The data suggest that women and Arabs have more pain postoperatively and consume more analgesics, compared to men and Jews. These subgroups have higher sensitivity to surgical pain in the first month after arthroscopic meniscec-

tomy. PSQ differences between the ethnicities support those results. The analysis of four groups, incorporating gender and ethnicity, reinforces the results with accentuated inter-group difference between Arab women and Jewish men.

This study aligns with previous studies that demonstrated higher pain level for women [17]. It also adds newer evidence of higher medication consumption.

Koren and colleagues [17] studied acute whiplash injuries in an Israeli ED setting and found that women had higher pain levels than men. However, the same rate of analgesics had been prescribed for both genders in that cohort. It should be mentioned that the outcome measure (prescription rate) was binary, so medication dosage was not mentioned.

Few studies on ethnic groups in Israel reported pain level differences. Gepstein et al. [16] examined the outcome of lumbar spine surgery and found no difference in outcome among ethnic groups. However, baseline functionality and pain levels were higher in the Arab cohort. It should be noted that in their study, long-term outcome was inspected (5 years follow-up, on average), which represents chronic pain in contrast to acute pain as in our study.

Two additional studies by Shavit and colleagues [18], performed retrospectively in ED settings, evaluated acute pain management and differences in pediatric patients with appendicitis or fractures. They did not find any difference in opiate consumption among the groups. They attributed this finding in part to strict pain management protocol in the ED.

A possible explanation for the contradicting result of our study is the different population studied: pediatric vs. adult. We assume that the difference in pain perception between ethnic and gender groups is cultural by its nature and it is possible that children are not influenced by these factors. Moreover, the study reflects a patient-controlled analgesia protocol, which is much more subjective.

Koren and co-authors [17] found that Arabs and Jews had the same VAS level in the immediate period after a whiplash injury. Nevertheless, Jews were prescribed less analgesic treatment at ED discharge despite an established pain management protocol.

The PSQ is a self-rate measure for pain perception based on imagined painful daily life situations and has been shown to correlate with experimentally obtained pain intensity. PSQ scores were higher in Arabs (5.84 vs. 4.62 points), which predicts a higher analgesics consumption. A previous study by our group demonstrated, using ROC analysis, that a PSQ cutoff of 5 points is predictive of higher analgesics consumption.

Baseline group differences may account, in part, for the results. Preoperative KOOS pain score was 11.4 points lower for women, and cartilage damage observed intraoperatively was more severe for women (2.38 vs. 1.17 ICRS score). Higher baseline pain may explain less improvement, as was shown by Bloise et al. [11], and concomitant cartilage damage may add pain. Intraoperative data were not available regarding possible interventions that were conducted on the cartilage (e.g., debridement of lesion margins). Haviv et al. [4] examined the difference between women and men after arthroscopic meniscectomy at the 1-year follow-up and found similar results. Women had higher preoperative pain and lower functional scores as well as higher concomitant chondral

damage. The authors concluded that lower functionality was correlated to cartilaginous damage.

Like women, preoperatively KOOS score was lower for Arabs and may account for lower postoperative scores.

From a clinical perspective, preoperative identification of surgical candidates with preponderance to higher pain can enable better pain management, reduce patient suffering, and reduce medical costs.

Our study has several advantages. It is a large cohort of APM patients, which enabled us to examine many parameters as potential pain modifiers. It is based on the Israeli population with its relevant ethnicities. This study reports patient pain sensitivity using the PSQ, which is patient-specific and considered to be a constant character. Pain sensitivity differences support the authenticity of the results.

There are also limitations. This study is retrospective with a level of evidence of III. There are baseline differences between groups such as age, Tegner score, chronicity, ICRS level, and preoperative KOOS score, which might have biased the results. Medication consumption was self-reported by the patients, which may induce a recall bias. Multi-drug consumption may have impacted the results. There is no single index that reflects total analgesic consumption for all medications and hence the statistical significance for each medication is assumed to be lower.

Future research in the subject should focus on prospective randomized trials on ethnicity, which could help clarify the magnitude of the effect of ethnicity on pain. Furthermore, collateral data about other orthopedic procedures in relation to ethnicity and gender could contribute to more precise conclusions.

## CONCLUSIONS

Women and Arabs experienced more pain and consumed more analgesics in the subacute period after APM. Surgeons should consider these populations when assigning pain management protocols after surgery.

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### Capsule

## Tricuspid-valve intervention in heart failure

In this randomized TRIC-I-HF trial, **Hausleiter** and colleagues assessed transcatheter tricuspid valve repair in patients with severe symptomatic tricuspid regurgitation and heart failure. Compared with optimal medical therapy alone, transcatheter repair significantly reduced the combined risk of death and heart failure hospitalization while improving quality of life. Patients undergoing intervention also experienced better functional status and

symptom relief. Procedure-related complications were infrequent, supporting the safety of this minimally invasive approach. The study establishes transcatheter tricuspid repair as an effective therapeutic option for appropriately selected patients with advanced tricuspid regurgitation.

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### Capsule

## Phase 1 study of Anito-cel, a d-Domain BCMA CAR T cell for refractory or recurrent myeloma

**Frigault** and co-authors studied anitocabtagene autoleucel (anito-cel), an autologous BCMA-directed CAR-T therapy containing a novel synthetic d-domain BCMA-binding element. The phase 1 trial enrolled 40 patients with heavily pretreated relapsed or refractory multiple myeloma; 38 received treatment. All treated patients had triple-class refractory disease, and 68% had penta-drug refractory disease. At a median follow-up of 38.1 months, the overall response rate was 100%. A complete response was achieved in 79%, and 92% achieved at least a very good partial response. Median progression-free survival was 30.2 months, with 57% progression-

free at 24 months. Overall survival at 36 months was 65%. Cytokine-release syndrome was common but was grade 1–2 in 94% of patients receiving the recommended phase 2 dose, with no grade ≥3 CRS in this group. ICANS occurred in 16% at grade 1–2 and in one patient (3%) at grade 3. Notably, investigators observed no delayed or non-ICANS neurotoxicity. The results suggest deep and durable activity of this novel CAR-T construct, although confirmation in larger studies is necessary.

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