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ORIGINAL ARTICLE

TIME OF RETURN TO WORK (RTW) MAY NOT CORRELATE WITH PATIENT-REPORTED OUTCOMES MEASUREMENTS (PROM) AT MINIMUM ONE YEAR POST ARTHROSCOPIC ROTATOR CUFF REPAIR

CZAS POWROTU DO PRACY (RTW) MOŻE NIE KORELOWAĆ Z WYNIKAMI POMIARÓW WYNIKÓW ZGŁASZANYCH PRZEZ PACJENTÓW (PROM) CO NAJMNIEJ ROK PO ARTROSKOPOWEJ NAPRAWIE PIERŚCIENIA ROTATORÓW

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ABSTRACT

Shoulder surgery is one of the procedures that unavoidably impacts on patients' work capacity. As current data focus on restoring range of motion, strength, and the patients' activity, to this day the data about RTW post shoulder surgery remain limited. A common understanding of the dual role of work is that it not only secures financial independence, but also acts as a significant source of psychosocial well-being and substantially participates in making life a meaningful one. The cost of incapacity is likely to be a multifactorial concern for both employers and employees, so the inability to return to work (RTW) can have a devastating impact on both mental health and self-confidence. The purpose of this study was to evaluate the return-to-work time of patients treated with rotator cuff repair (RCR) and to evaluate if patient-reported outcomes (PROM) correlate with the incapacity to work after RCR. We performed a retrospective review by conducting a questionnaire with patients more than 12 months after surgery and we identified 71 patients who met the criteria for the study and were able to contact 34 of them. In this paper we demonstrate that patients after RCR returned to work on average within 3.49 months post-surgery and patients with office work returned to work faster than physical workers. Patient-reported outcomes may not correlate with time needed to return to work, but they correlate with time needed to return to physical activity.

Keywords: shoulder surgery, arthroscopy, rotator cuff, return to work

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STRESZCZENIE

Operacja barku jest jednym z zabiegów, które nieuchronnie wpływają na zdolność pacjenta do pracy. Ponieważ obecne dane koncentrują się na przywróceniu zakresu ruchu, siły i aktywności pacjentów, do dnia dzisiejszego dane dotyczące powrotu do pracy po operacji barku pozostają ograniczone. Powszechnie uznaje się, że praca pełni podwójną rolę: nie tylko zapewnia niezależność finansową, ale także stanowi istotne źródło dobrostanu psychospołecznego i w znacznym stopniu przyczynia się do nadania życiu sensu. Koszt niezdolności do pracy jest prawdopodobnie wieloczynnikowym problemem zarówno dla pracodawców, jak i pracowników, dlatego niemożność powrotu do pracy (RTW) może mieć druzgocący wpływ zarówno na zdrowie psychiczne, jak i pewność siebie. Celem niniejszego badania była ocena czasu powrotu do pracy pacjentów poddanych zabiegowi naprawy pierścienia rotatorów (RCR) oraz ocena, czy wyniki zgłaszane przez pacjentów (PROM) korelują z niezdolnością do pracy po zabiegu RCR. Przeprowadziliśmy retrospektywny przegląd, przeprowadzając ankietę wśród pacjentów ponad 12 miesięcy po zabiegu i zidentyfikowaliśmy 71 pacjentów, którzy spełniali kryteria badania, a z 34 z nich udało nam się skontaktować. W niniejszym artykule wykazujemy, że pacjenci po RCR powracali do pracy średnio w ciągu 3,49 miesiąca po operacji, a pacjenci wykonujący pracę biurową powracali do pracy szybciej niż pracownicy fizyczni. Wyniki zgłaszane przez pacjentów mogą nie korelować z czasem potrzebnym do powrotu do pracy, ale korelują z czasem potrzebnym do powrotu do aktywności fizycznej.

Słowa kluczowe: operacja barku, artroskopia, pierścień rotatorów, powrót do pracy

Introduction

Shoulder pathologies are the third most common musculoskeletal reason for consultation in primary care and second most common cause of referrals to orthopedic and sports medicine clinics (Urwin *et al.,* 1998). As well as resulting in an inability to return to work (RTW), they can also affect mental health and self-esteem in a negative way (Strazdins *et al.,* 2004, D'Souza *et al.,* 2003, Rajani *et al.,* 2016, Saunders and Nedelec, 2014). According to Heijden *et al.* the annual incidence of shoulder pathologies about 7% and its lifetime prevalence about 10% and of all new episodes of SD presenting to primary care roughly 50% tend to resolve within 6 months, compared with about 40% that appear to continue for up to 12 months (van der Heijden, 1999). A number of pathologies and traumatic events of the shoulder can result both in pain and in a negative impact on the quality of daily life. Among potential underlying issues is rotator cuff disease. This condition may occur following a traumatic event; however, it is mostly known to develop with age. Teunis *et al.* showed in their systematic review increasing abnormalities of rotator cuff with age – from 9.6% in patients aged 20 years and younger to 62% in patients of 80 years old and older (Teunis *et al.,* 2014). For some individuals, the condition may remain asymptomatic or can be treated effectively with rehabilitation, however for patients with significant complaints and restricted mobility, surgical treatment with rotator cuff repair (RCR) is considered.

Outcome of shoulder surgery is routinely assessed based on restoring the range of motion, strength, and the patients' activity, yet the data about RTW post shoulder surgery remains limited. To our knowledge, the biggest available study with 1773 cases reported the majority of patients treated arthroscopically by a single surgeon, 77% (40% with full duties and 37% with light duties) patients managed to RTW (Jayasekara *et al.,* 2020). Another SR with 13 studies and 1.224 patients reported 62.3% of patients after RCR were able to return to their previous level of work

at 8.15 +/–2.7 months after surgery (Haunschild *et al.,* 2021).

The purpose of this study is to evaluate the return-to-work time of patients treated with an arthroscopic rotator cuff repair. The secondary aim was to evaluate if patients reported outcomes (PROM) correlate with the incapacity of work after an arthroscopic RCR.

Materials and methods

We obtained the approval of the Bioethical Commission of the Medical University of Lodz prior to commencing our study (RNN/125/23/KE, approved on 16 May 2023).

A retrospective review of the hospital's database was performed to identify all the patients who underwent arthroscopic rotator cuff repair. We reviewed the database charts to identify patients who met the inclusion criteria. The inclusion criteria were: 1. Patients must be professionally active, 2. Minimum follow-up of at least one year post-surgery, 3. Patients have to be available under the phone number provided, 4. Patients have to agree to take part in the study, 5. Surgery performed by the fellowship-trained shoulder surgeon. Exclusion criteria were: 1. Age under 18, 2. Previous surgeries of the affected shoulder, 3. Surgery performed by other surgeons than the senior author, 4. Follow-up of less than 1 year. The surgical procedures were conducted by a shoulder surgeon who had received specialized training through a world-recognized shoulder surgery and sports orthopedics fellowship program. We analyzed all patients, whose surgery took place from 2019 to 2022.

All patients were contacted via phone and were asked to provide the time needed to return to work, type of work (physical vs office job), return to sport activities and were surveyed using Single Assessment Numeric Evaluation (SANE), Global Rating of Change (GRoC) and Simple Shoulder Test (SST) scoring systems.

SANE has been introduced by Williams *et al* in 1999 as a simple, single question evaluation: "How would you rate your shoulder today as a percentage of normal (0% to 100% scale with 100% being normal)?" (Williams *et al.,* 1999). It was later independently validated in shoulder patients by Thigpen *et al* in 2018 (Thigpen *et al.,* 2017).

GRoC is a questionnaire that provides a measure of global well-being that is based on progress, or its lack, since an initial treatment (Kamper *et al.,* 2009).

SST consists of 12 questions, with response of yes/no, evaluating patients' tolerance to specific activities (Lippitt *et al.,* 1993).

All the questionnaires described above and utilized in the study, along with their corresponding questions, are shown in Table 1.

Table 1. Summary of questionnaires.

GRoC	How would you rate your shoulder in comparison to the situation before the surgery, if –7 is much worse and 7 is much better?
SANE	How would you rate your shoulder on the scale from 0 to 100, if 100 is a painless shoulder with full functionality?
SST	1. Is your shoulder comfortable with your arm at rest by your side? 2. Does your shoulder allow you to sleep at night? 3. Can you reach the small of your back to tuck in your shirt with your hand? 4. Can you place your hand behind your head with the elbow straight out to the side? 5. Can you place a coin on a shelf at the level of your shoulder without bending your elbow? 6. Can you lift 0.5 kg to the level of your shoulder without bending your elbow? 7. Can you lift 4 kg to the level of the top of your head without bending your elbow? 8. Can you carry 10 kg at your side with the affected extremity? 9. Do you think you can toss a tennis ball underhand 10 m with the affected extremity? 10. Do you think you can toss a tennis ball underhand 20 m with the affected extremity? 11. Can you wash the back of your opposite shoulder with the affected extremity? 12. Would your shoulder allow you to work full-time at your usual job?

The statistical analysis was conducted using the Statistica 13 package (Tibco Software Inc.). The concordance of scales was examined by calculating Kendall's tau coefficient, due to the

ordinal nature of the scales and the different ranges of each. The comparison of the time to return to work depending on the type of job was performed using the Mann-Whitney U test, and the relationship between the time to return to work and the age of the patient was examined by calculating the Spearman's correlation coefficient. The level of statistical significance in all tests was set at $\alpha = 0.05$.

Results

In our database 104 patients after arthroscopic surgery of the shoulder in the years 2019–2022 were found. From a total of 104, 71 patients went through rotator cuff repair. From this number of patients, we were able to contact 41 (29 males and 12 females) and 34 of them met the inclusion criteria (7 were pensioners – 17%). The average patient's age on the day of the surgery was 57 (range 23–71).

In our survey patients were asked whether they managed to return to work (RTW) or not. All but two managed to return to work, which resulted in a 94% ratio of return to work. The mean time of return to work for the rest (n = 32) was 4.23 months: physical workers (21) – 4.79, office workers (11) – 2.9 and two patients did not return to work.

Most patients were satisfied with the result of surgery: mean SST – 8.9, SD = 3.4, MIN = 0. MAX = 12, mean GROC 4.9, SD = 2.8, MIN = −5, MAX = 7 and mean SANE – 71.9, SD = 21.7, MIN = 20, MAX = 100.

There was no statistically significant correlation between time of return to work and all 3 scales (GROC – for physical workers – p = 0.81, office workers – p = 0.48, SST for physical workers – p = 0.24, office workers – p = 0.37, SANE – for physical workers p = 0.63, office workers – p = 0.22) in all groups. Correlation between age and time of return to work was not statistically significant (p = 0.49).

17 of the 34 patients did not return to sport. The mean time of return to sport for the rest (24 patients) was 6.79 months (range from 2 to 12 months). The correlation between each scale and return to work: SANE (p < 0.001), GROC (p = 0.001), SST (p < 0.001) is statistically significant – the higher result, the faster the return to sport. We have listed the essential findings in Table 2.

The correlation between (shown in Table 3) all each scale were statistically significant (using Kendall's tau): SANE and GROC (p < 0.001, Kendall's tau 0.54), SANE and SST (p < 0.001, Kendall's tau 0.47), GROC and SST (p < 0.001, Kendall's tau 0.40).

We also stratified the results regarding the type of work. Patients with office work returned to work faster than physical workers, as shown in Table 4.

Discussion

To our knowledge this is the first study, based on arthroscopic rotators cuff repair patients, that not only evaluated the time of return to work, but tried to correlate RTW with patients-reported outcomes (PROMs). The main finding of this study is that patients returned to work on average within 3.49 months post-surgery. There was no correlation between RTW and PROMs, however, there was a correlation between return to sport and PROMs (using GRoC, SANE, SST).

The evaluation of shoulder surgeries outcomes can be done by assessing different factors such as range of motion, PROMs, failure rate, return to sport or return to work. Given the social background and well-being of the individual, the return-to-work evaluation might be one of the most relevant indicators for assessing treatment outcomes. The importance of work for most individuals seems to be evident however, in the literature we can find a very thorough analysis of individuals' approaches to work. Ostlund *et al.* explained, that for people with musculoskeletal pain, meaning of work is derived in four ways: some are workaholics (driven by the need of work), some are work manics (who try to avoid inactivity), some are workhorses (who want to satisfy the needs of people around them) and some are relaxed workers (they try to fulfill their needs and desires) (Östlund *et al.*, 2002). Moreover, the effects of job insecurity on human life are worth considering.

Table 2. Summary of the most important findings.

	n	Median	Quartile	Quartile	Min	Max
Age	32	57	47	62	23	70
RTW (months)	32	3	2	6	1	18
RTPA (months)	24	6	4.75	9	2	12
SANE (0–100)	32	80	65	90	20	100
GROC (-7–7)	32	6	5	7	-5	7
SST (0–12)	32	11	9	12	0	12

Table 3. The correlation between scales.

	Kendall's tau	p
SANE vs GROC	0.54	<.001
SANE vs SIMPLE SHOULDER TEST	0.47	<.001
GROC vs SIMPLE SHOULDER TEST	0.40	<.001

Table 4. RTW regarding the type of work.

	Median	1–3 quartile	P
Office work	2	1.5–3	.001
Physical work	5	3–6	

According to Waddell and Burton *et al.* working is a beneficial factor that can ensure not only financial autonomy, as well as psychosocial well-being (Waddell and Burton, 2006). One study found that both perceived job insecurity and unemployment constitute significant risks of increased depressive symptoms (Kim and von dem Knesebeck, 2016). Aside from that, work itself could serve also as a source of personal identity and social status (Waddell and Burton, 2006).

Work disability is not only an individual problem, but should be seen as a challenge and area of concern for society. The social expense of work disability is substantial. Data from the World Bank and the World Health Organization (WHO) demonstrate that the cost of work disability exceeds one trillion U.S. dollars, which is about 4–5% of the gross domestic product (GDP) in the United States (Metts *et al.,* 2007). Hence, from a social aspect, RTW may be one of the most crucial factors in assessing the success of any treatment.

When it comes to RTW after rotator cuff repair, data is still limited. In our study, the average RTW differed according to the type of work performed. Considering all patients, the median RTW time was 3 months (range from 1 to 18 months). However, we also analyzed this correlation in relation to the type of job carried out. For office work, the average return time was 2 months, while for physical work it was 5 months (Table 4). Some studies tried to find the predictive factors for the duration until RTW. Anne Pichene-Houard in her study reported that variables significantly predictive of RTW time were: work physical demand levels, preoperative sick leave, the number of body parts causing pain or discomfort in the last 12 months, self-assessed 2-year workability and the Readiness for RTW Scale. The study showed that the mean time until RTW was 225 days (SD 156) (Pichené-Houard *et al.,* 2021). Another study focused only on RTW time showed that 77% of patients after isolated RCR were able to return to work 6 months after shoulder surgery with 39% chances of returning to full duties according to Jayasekara (Jayasekara *et al.,* 2020). Another study reported that 62.3% of patients

were able to return to their previous level of work at 8.15 +/–2.7 months following RCR surgery (Haunschild *et al.,* 2021). These studies did not try to find any correlations or predictive factors for RTW. According to our data, there have not yet been attempts to correlate RTW with PROMs after RCR.

Interestingly there are many more studies that examine return to sport after RCR. A Systematic Review and Meta-Analysis published in 2015 showed that from 859 patients with mean follow-up of 3.4 years, 84.7% returned to sport, including 65.9% at an equivalent level of play, after 5 to 17 months. From the professional and competitive athletes 49.9% returned to the same level of play (Klouche *et al.,* 2016).

When it comes to the failure rate Johannsen *et al.* found in their study, that of 91 patients in total, 5 (5.5%) failed and required revision surgery (the mean follow-up was 11.5 years) (Johannsen *et al.,* 2021). In our study, we found that of 34 patients 3 of them required revision surgery due to anchor loosening, 1 patient had exacerbation of carpal tunnel syndrome and 1 underwent RSA surgery 1.5 years after rotators cuff repair.

This study also has its limitations. As we wanted to report single surgeon cases, we therefore have a limited number of patients included in our research. Nevertheless, to our knowledge this is the first attempt to evaluate patient-reported outcome measurements correlated with time needed to return to work after rotator cuff repair.

Conclusion

The study reports that patients who underwent arthroscopic rotator cuff repair may expect to return to work within 3.49 months from the surgery. Office workers tend to return to work significantly faster – with a median of 2 months post-surgery. Patient-reported outcomes may not correlate with time needed to return to work, but they correlate with time needed to return to physical activity.

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Institutional Review Board Statement

The study has an approval of the Bioethical Commission of the Medical University of Lodz prior to commencing our study (RNN/125/23/KE, approved on 16 May 2023).

Informed consent statement

Informed consent was obtained from all subjects involved in the study.

Conflicts of interest

The authors declare no conflict of interest.

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