

Bręborowicz E., Bręborowicz M. Non-operative treatment in shoulder pain. Evidence based medicine approach. *Issue Rehabil. Orthop. Neurophysiol. Sport Promot.* 2016; 14: 7–12.

#### NON-OPERATIVE TREATMENT IN SHOULDER PAIN. EVIDENCE BASED MEDICINE APPROACH

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#### SUMMARY

##### Introduction

The pain is one of the most common symptoms of shoulder injuries or its disorders. Therapeutic teams can choose the best option for their patients from many treatment methods. Not all of them are scientifically evaluated.

##### Aim

The aim of this study is to determine which of the non-operative methods of the shoulder pain treatment are proved as effective in the literature.

##### Methods

The review of available Evidence Based Medicine literature on non-operative methods of shoulder injuries treatment.

##### Results and conclusions

The most effective therapy techniques towards pain in shoulder are pharmacological treatment (corticosteroid injections, non-steroidal anti-inflammatory drugs), physiotherapeutic exercises (stretching, shoulder muscle balance exercises, eccentric training), manual therapy (muscle relaxation techniques, myofascial trigger points therapy). Physical therapy procedures may improve the final results of conservative treatment.

**Keywords:** shoulder pain, non-operative treatment

#### LECZENIE NIEOPERACYJNE W ZESPOŁACH BÓLOWYCH BARKU. PODEJŚCIE OPARTE O DOWODY NAUKOWE MEDYCYNY

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#### STRESZCZENIE

##### Wprowadzenie

Ból jest jednym z najczęściej występujących objawów uszkodzeń barku. Zespoły terapeutyczne mogą wybrać najlepszą opcję z wielu metod leczenia dla swoich pacjentów. Nie wszystkie z nich zostały ocenione w oparciu o dowody naukowe.

##### Cel

Celem tej pracy jest próba określenia skuteczności metod nieoperacyjnych w leczeniu bólu barku w świetle dostępnej literatury.

##### Metody

Przegląd dostępnej literatury opartej o *Evidence Based Medicine* na temat nieoperacyjnych metod leczenia uszkodzeń barku.

##### Wyniki i wnioski

Najskuteczniejsze techniki terapii w leczeniu bólu w obrębie barku stanowią leczenie farmakologiczne (iniekcje kortykosteroidów, stosowanie niesterydowych leków przeciwzapalnych), ćwiczenia fizjoterapeutyczne (stretching, ćwiczenia równowagi czynności mięśni barku, ćwiczenia ekscentryczne), terapia manualna (techniki relaksacyjne mięśni, terapia powięziowych punktów spustowych bólu). Procedury fizjoterapeutyczne wspomagają poprawę ostatecznego wyniku leczenia zachowawczego.

**Słowa kluczowe:** ból barku, leczenie nieoperacyjne

Date received: February 2, 2016  
Date accepted: February 10, 2016

Data otrzymania: 2 luty, 2016  
Data zaakceptowania: 10 luty, 2016

## Introduction

The International Association for the Study of Pain defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Merskey 1994). This sensation is always subjective. Contemporary wide range of therapy towards the shoulder pain is described.

In subacromial impingement syndrome, pain is usually connected with inflammation and soft tissues compression due to changes in subacromial space (Morrison *et al.* 1997; Perez-Merino *et al.* 2011). In the first phase after rotator cuff tear, the pain is a result of tissues injury and inflammatory response. Later it can change into chronic pain (Dessem and Lovering 2011). After shoulder dislocation and reduction, the pain appears usually as result of muscle spasm and inflammation. It is also caused by injury of soft tissues (Blackburn and Guido 2000; Leggin *et al.* 2011). In cases of “frozen shoulder” also the end of the range of motion exercises causes pain apart from inflammatory reaction.

There are additional factors predisposing to the shoulder pain like overweight (especially abdominal obesity), diabetes mellitus and smoking. In general, these factors affect both genders similarly (Rehardt *et al.* 2010).

## Aim

The aim of this study is to determine the non-operative methods of the shoulder pain treatment that are proved as effective in the literature.

## Methods and results

### *Injections/Nonsteroidal anti-inflammatory drugs*

Decreasing of inflammation in subacromial space is one of the most important goals especially at the beginning of the therapy. It allows healing of involved tissues (Morrison

*et al.* 1997). In the primary health care, usually nonsteroidal anti-inflammatory drugs are prescribed (Van Der Windt *et al.* 1995). Petri *et al.* (1987) compared oral NSAIDs with placebo and showed significant improvement in NSAIDs group after 2 weeks. However, after 4 weeks of treatment this difference was not statistically significant. Other reports also showed short term efficacy of NSAIDs application (Van Der Windt *et al.* 1995). Cummins *et al.* (2009) showed that NSAIDs connected with rehabilitation program are effective in 79% of patient with subacromial impingement. Corticosteroid injections are significantly more effective than NSAIDs (Van Der Windt *et al.* 1995). Rhon *et al.* (2014) noticed that in subacromial impingement syndrome treatment subacromial corticosteroid injection can give similar result as manual therapy. The best effects appears after one months, after this period improvement reached the constant level. Other clinical researches proved that in rotator cuff tendinopathy, corticosteroid injection gave similar effect as transcutaneous electrical nerve stimulation (TENS) and provided the immediate pain reduction (Desmeules *et al.* 2015). If the pain of the long head of the biceps tendon is diagnosed in tests with the injection, it should be addressed to bicipital groove (Provencher and Romeo 2012). The pain in acromioclavicular joint can be treated with the corticosteroid injection (Provencher and Romeo 2012). Diagnostic aspect of corticosteroid injection is also very important in identification of the source of the pain, improvement after administration means that proper tissue/structure was addressed (Provencher and Romeo 2012).

### *Immobilization*

Short-term immobilization (2–4 weeks) allows for tissues healing and the pain control.

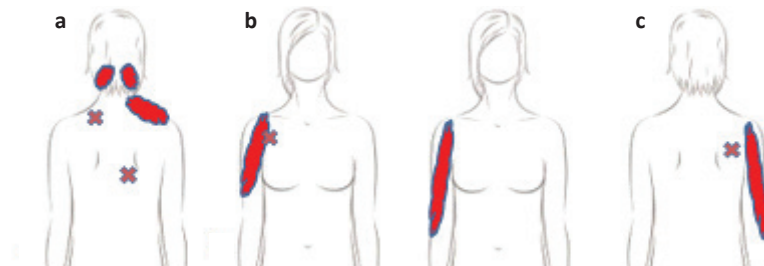
Decrease of ROM, deterioration of joint proprioception and muscle atrophy may develop if immobilization is too long (Dessem and Lovering 2011). That is why it is important to use immobilization as short as possible and as long as it is necessary.

#### Manual therapy

Rhon *et al.* (2014) showed that manual therapy can give similar results as corticosteroid injection especially at the beginning of subacromial impingement conservative treatment. Systematic review reported that muscle relaxation with manual soft tissue therapy and joint mobilization give satisfactory effect in subacromial impingement therapy (Michener *et al.* 2012). Muscle relaxation applied to trapezius, pectoralis minor, levator scapulae seems to be effective in treatment of pain associated with rotator cuff tears (Collin *et al.* 2015). Trigger points therapy is one of the best-described types of manual therapy. Trigger points are defined as local points that are painful on compression, can produce referred pain in reference zones and gives muscle hypertension (Bron *et al.* 2011a, 2011b). Trigger points are also responsible for myofascial pain (Simons 1999). Myofascial trigger points compression with tight muscle relaxation massage techniques and ice cube massage gives good results in chronic shoulder pain (Bron *et al.* 2015). The most common trigger points in shoulder are localized in upper and lower trapezius muscle, anterior deltoid muscle, infraspinatus muscle (Figure 1a–c) (Simons 1999).

#### Exercises

Pain is usually associated with increased tension of muscles. Muscle stretching and active relaxation techniques (postisometric relaxation) are helpful in pain reduction (Morrison *et al.* 1997; Michener *et al.* 2004). Exercises, which normalize dysfunctional patterns of motion and restore muscle balance between deltoid muscle and humeral head depressors are recommended in shoulder pain treatment (Michener *et al.* 2004; Collin *et al.* 2015). Usually eccentric contraction is responsible for muscle injury, but the same contraction can also provide significant protection against the future injury due to increasing number of sarcomeres and normalization of tendon structures (Ohberg *et al.* 2004; Dessem and Lovering 2011). During eccentric muscle training the fibroblasts activity increases, collagen formation is facilitated and collagen structure is remodeled (Camargo *et al.* 2014). Many researchers proved that pain treatment with eccentric muscle training is effective in patients with Achilles tendinosis (Ohberg *et al.* 2004; Chester *et al.* 2008). Other clinical trials have shown that eccentric training of supraspinatus, infraspinatus and deltoid muscles is helpful in pain reduction in patients with subacromial impingement (Jonsson *et al.* 2006; Bernhardsson *et al.* 2011). Maenhout *et al.* (2013) have compared the effectiveness of traditional rotator cuff strengthening with rotator cuff training combined with eccentric exercise and with increasing load by dumbbells. The eccentric program involved heavy loads. In isometric abduction, the evaluation of eccentric



**Figure 1.** Location of trigger points and referred pain in (a) upper and lower trapezius, (b) anterior deltoid, (c) infraspinatus muscles. Modified after Simons (1999).

training group recorded higher results, but improvement in SPADI score was slightly better in traditional training than in eccentric training (no statistical significant differences were detected) (Maenhout *et al.* 2013). It can be concluded that the load in eccentric training is important, if it is too heavy, the result may be not satisfactory.

#### *Physical therapy*

Transcutaneous electrical nerve stimulation is one of the best scientifically proved modality. It is effective in patients with shoulder instability (Blackburn and Guido 2000). Desmeules *et al.* (2015) showed that one TENS session provide immediate pain reduction similar to corticosteroid injection in patients with rotator cuff tendinopathy. TENS in combination with ultrasound are helpful in frozen shoulder treatment (Page *et al.* 2014). Pérez-Merino *et al.* (2015) proved that there are no differences in pain scored with Visual Analog Scale results between application of ultrasounds, phonophoresis and iontophoresis (with dexketoprofen) after one month therapy. However other systematic review denied effectiveness of ultrasound (Michener *et al.* 2004).

#### **Conclusions**

Wide range of the shoulder conservative pain therapy is described in the literature. It allows choosing the best option for patients. In some cases it might cure the patient, in other, to better prepare the patient for surgery.

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*Authors reported no source of funding.  
Authors declared no conflict of interest.*

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*Autorzy nie zgłosili źródła finansowania.  
Autorzy nie deklarowali konfliktu interesów.*

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