The effect of soft tissue and exercise based interventions of the kinematic chain in a patient with bilateral frozen shoulders

Eriksrud, O., Parnevik-Muth, J., Ghelem, A. [1,2]

[1] Athletic 1080 AB, Stockholm, Sweden
[2] 1080 Motion AB, Stockholm, Sweden

Introduction

Mobility of the shoulder joint and scapulothoracic articulation, made possible by the acromioclavicular and sternoclavicular joint, allows for the effective placement of the hand in three-dimensional space. Furthermore, trunk and hip function will contribute to this function as well. Restrictions to any of these joints and regions will restrict the ability for the effective placement of the hand in three-dimensional space.

Frozen shoulder is an idiopathic or secondary adhesive capsulitis due to injury or surgery (Page & Labbe, 2010). It is characterized by stiffness and pain in the shoulder joint. Mobility restrictions in a patient with frozen shoulder are shoulder flexion, abduction, internal and external rotation, which also will influence mobility and positioning of the scapulothoracic articulation (Page & Labbe, 2010).

1080 Movement Assessment Profile (1080 MAP) is based upon the unique combination of upper extremity reaches in different directions, and measured in centimeters and degrees. The ability to perform different reaches is dependent upon the combination of specific joint and regional mobility. Consequently, the results of different tests will give information about limitation of what motion as well as what joint(s) and region(s) that are limited (Eriksrud, 2013). Furthermore, the created profile gives a great overview of the reaching ability, or positioning, of the hand in three-dimensional space (Figure 1 below). It is a good visual for both the healthcare professional and the patient as to how mobile or restricted hand positioning is.

The purpose of this case study is to (1) use 1080 MAP movement screen to determine joint(s) and region(s) of intervention and (2) document effectiveness of a mobility based training program.

Subject description

HJ is a 49-year-old male with idiopathic bilateral frozen shoulder. He first noticed this impacting his function September 2013 and was later diagnosed by his medical doctor in December 2013. HJ works as architect, and his goals coming to training is to increase shoulder mobility, decrease pain and improve overall functional performance. HJ is an amateur basketball player unable to perform a basketball shot without pain regardless of distance to the basket.

Examination

Pain associated with shoulder movement and activities of daily living were 6/10. All overhead activities (6/10) were especially difficult with occasional stabbing pain (8/10)

Mobility was evaluated bilaterally using 1080 MAP hand reaches. Profiles standing on the left and right foot is presented in Figure 1 below. A total 1080 MAP score of 1.6 was calculated, with 1.6 and 1.7 left and right respectively. On the left foot the subject was unable to get the left arm to vertical and reach along the R135 vector. He was able to assume a position 38 cm in front of vertical, thus a 0 score in this direction. On the right foot the subject was unable to get the right arm to vertical and reach along the L135

vector. He was able to assume a position 37 cm in front of vertical, thus a 0 score in this direction as well.

Specific joint mobility testing of the shoulder joint was not performed, since the client was evaluated and trained by a physical trainer, and not a health care professional.

Figure 1: 1080 MAP at initial visit

Based upon these profiles, all movements that contribute to extension patterns for both arms, from the hip and upward, in all three planes of motion were targeted in the training program.

Intervention

Hip mobility was targeted in quadruped and kneeling with a focus on extension, internal and external rotation. Scapulothoracic mobility was facilitated with posterior tilt, depression and retraction in combination thoracic mobility and soft tissue treatment to infraspinatus, serratus anterior, levator scapualae, pectoralis minor and trapezius. Standing closed chain shoulder mobility exercises targeted extension, flexion, abduction, adduction, internal and external rotation were done dynamically 2*15 repetitions 3 times a day. This was decreased to 1-2 times a day for 5-6 days a week after one month.

Outcome

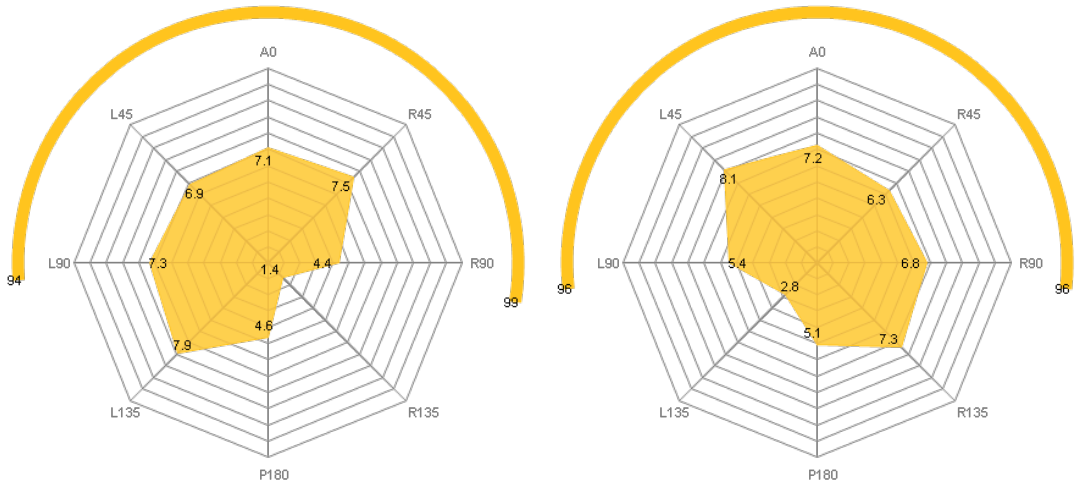
After three weeks, and two training sessions, the same 1080 MAP profile was performed (Figure 2). A total 1080 MAP score of 3.3 was calculated, with 3.2 and 3.4 left and right respectively. This is an increase in 106% in the total score. What is more important is the ability of the patient to position and thus cover a greater area with arm reaches. This area is easily visualized when comparing the pre and post profile.

Furthermore patient was able to do play basketball without pain. He could now perform a basketball shot from 0 to 3 meters away from the basket without pain.

Figure 2: 1080 MAP after 3 weeks (09.04.14)

Total score:	Total score left:	Total score right:	Instructor:
3.3	3.2	3.4	Ali Ghelem (trainer)

Notes:



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The patient has continued to make progress over the past 3 months as is indicated from the profiles below.

Figure 3: 1080 MAP (23.05.14)

Total score:	Total score left:	Total score right:	Instructor:
3.9	4.1	3.8	Ali Ghelem (trainer)

Notes:

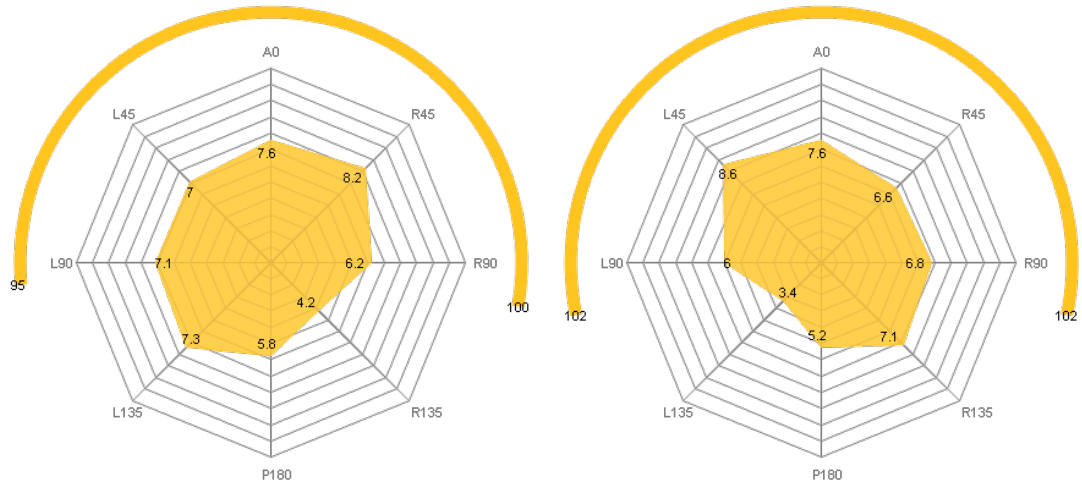

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Figure 4: 1080 MAP (12.06.14)

Total score:	Total score left:	Total score right:	Instructor:
4.1	4.2	4	Ali Ghelem (trainer)

Notes:

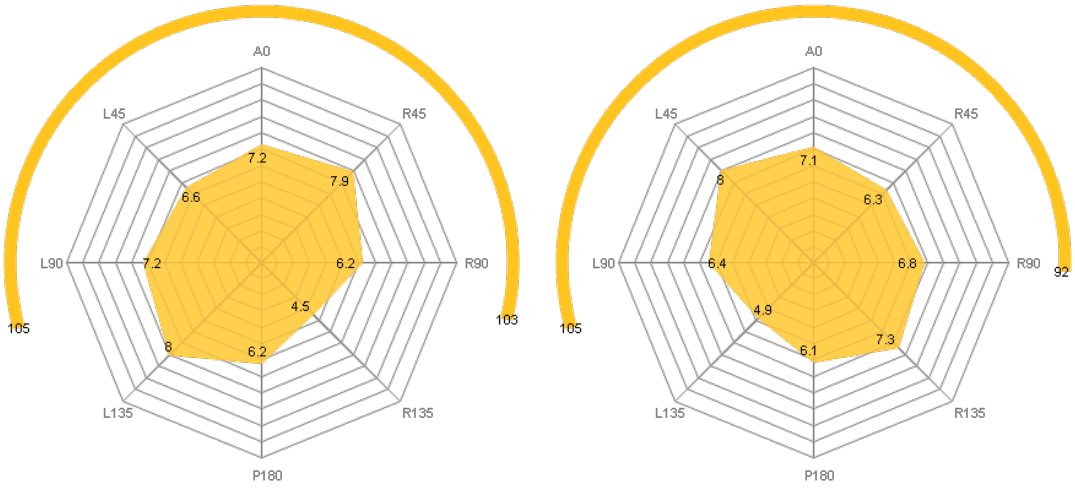

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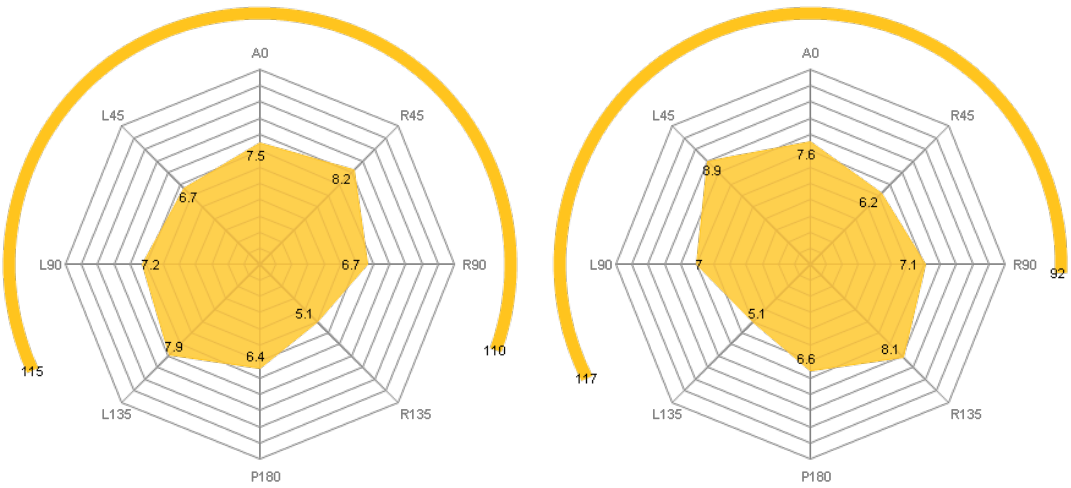
Figure 5: 1080 MAP initial visit (02.07.14)

Total score:	Total score left:	Total score right:	Instructor:
4.7	4.7	4.7	Ali Ghelem (trainer)

Notes:



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After three and a half months, and 6 training sessions, the same 1080 MAP profile was performed (Figure 2). A total 1080 MAP score of 4.7 was calculated, with 4.7 and 4.7 left and right respectively. This is an increase in 194% in the total score. What is more important is the ability of the patient to position and thus cover a greater area with arm reaches. This area is easily visualized when comparing the pre and post profile.

Furthermore patient was able to do play basketball without pain. He could now perform a basketball shot from 0 to 3 meters away from the basket without pain. HJ is now pain free at rest and in his daily work as an architect.

Discussion

Great improvement in mobility and function were made in only a short time. These results are rather unusual in patients with frozen shoulders. In this case the contribution of scapulothoracic articulation, thoracic spine and hips were considered. A more local and specific approach to the shoulder is more common in physical therapy (Page & Labbe, 2010). The good results in a short time in this case are interesting in that the rest of body is more carefully considered in the training. In light of the fact that some frozen shoulders are idiopathic in nature makes these findings even more interesting.

In conclusion this case shows the efficacy of integrating the whole body in training someone with a frozen shoulder. The improved reaching performance can not only be contributed to improvements in mobility of the scapulothoracic articulation and shoulder joints, but rather in combination with thoracic spine and the hip mobility. Furthermore, this is status report, since HJ is continuing to make improvements as a result of his training.

References

Eriksrud, O. A., P. Andreassen, E.H. Litsos, S. Sæland, F.O. Federolf, P. Cabri, J. (2013). *Challenges and opportunities in developing a test battery for joint mobility using reach tasks starting from upright standing positions.* Paper presented at the IcSports 2013, Vilamoura, Portugal.

Page, P., & Labbe, A. (2010). Adhesive capsulitis: use the evidence to integrate your interventions. *North American journal of sports physical therapy : NAJSPT, 5*(4), 266-273.