Authors' Responses to Reviewer's Comments

The authors would first like to thank the reviewer for his/her insightful comments and the editorial office for their guidance through the first decision for our manuscript. We have thoroughly reviewed the comments made by the reviewer which has enriched our manuscript after following its recommendations.

According to science editor's comments a literature review has been also conducted and the guidelines of the "CARE Checklist – 2016: Information for writing a case report" have been adopted.

We have highlighted the modified text in the revised manuscript for your convenience.

Reviewer's comment: Dear Ladies and Gentlemen, Dear Journal-Team, the manuscript 'Contralateral trapezius transfer to treat scapular winging: Case report and surgical technique' describes an innovative technique for scapular winging due to injury to the dorsal scapular nerve and the Mm. rhomboidei major and minor. The manuscript is well written. The figures are sufficient.

-Scientific quality: grade B (very good)

-Language quality: grade A (priority publishing)

-Conclusion: Minor revision

Author's response: Thank you.

Reviewer's comment #1: The minor rhomboid muscle originates from the cervical spinous processes 6-7 and the major rhomboid muscle from the thoracal spinous processes 1-4. Major and minor rhomboid muscles are both innervated by the dorsal scapular nerve (C5), insert at the scapula medially, press the scapula on the thorax and pull it to the spine as precondition for retroversion and internal rotation in antagonization of the serratus anterior muscle which is innervated by the long thoracic nerve (C5), inserts at the scapula medially as precondition for anteversion and external rotation. An elevation of the arm is still possible in

rhomboid muscle insufficiency. For full movement both preconditions have to be met. The other involved muscles are: serratus anterior muscle (strongest elevation/abduction of more than 90°), pectotalis major muscle (anteversion, internal rotation), M. pectoralis minor (adduction, internal rotation), coracobrachial muscle (anteversion), deltoid muscle (abduction up to 90°, strongest anteversion with its clavicular part, external rotation with its clavicular part, retroversion and internal rotation with its spinal part), subscapular muscle (strongest internal rotation), supraspinatus muscle (external rotation and additionally abduction), infraspinatus muscle (strongest external rotation), teres major muscle (strongest retroversion, internal rotation), teres minor muscle (external rotation), latissimus dorsi muscle (adduction, retroversion, internal rotation), trapezoid muscle (elevation/abduction of more than 90° with its descending part).

Author's response: Knowledge of the anatomy and biomechanics of the shoulder are crucial for accurate understanding of the surgery that we detail in this manuscript. We have augmented our text in the Introduction to present the background information necessary for a reader to achieve this understanding. We have also added some additional data regarding shoulder anatomy:

"To understand this pathology, the anatomy of the shoulder must be fully known. The minor rhomboid muscle originates from the cervical spinous processes 6-7 and the major rhomboid muscle from the thoracal spinous processes 1-4. The major and minor rhomboid muscles are both innervated by the dorsal scapular nerve which originates from C5 or C5 and C6[6], inserts at the scapula medially, presses the scapula on the thorax and pulls it to the spine. This anatomy preconditions for retroversion and internal rotation in antagonization of the serratus anterior muscle which is innervated by the long thoracic nerve which originates from C5, C6 and C7[7], and inserts at the scapula medially. This anatomy preconditions for anteversion and external rotation. With rhomboid muscle insufficiency, elevation of the arm is still possible but for full movement both preconditions have to be met.

The other involved muscles (function) in scapular girdle motion are: pectoralis major muscle (anteversion, internal rotation); pectoralis minor muscle (adduction, internal rotation); coracobrachialis muscle (anteversion); deltoid muscle (abduction up to 90°, strongest anteversion with its clavicular part, internal rotation with its clavicular part, retroversion and external rotation with its spinal part); subscapular muscle (strongest internal rotation); supraspinatus muscle (external rotation and additionally abduction); infraspinatus muscle (strongest external rotation); teres major muscle (strongest retroversion, internal rotation); teres minor muscle (external rotation); latissimus dorsi muscle (adduction, retroversion, internal rotation); and, trapezoid muscle (elevation/abduction of more than 90° with its descending part)."

Reviewer's comment #2: The accessory nerve is a cranial nerve which originates from the first five to six spine segments before entering the cranium through the foramen magnum (Ramus externus or Radices spinales) and is then accompanied by its cranial part that originates from the oblongata medulla (Ramus internus or Radices craniales). Both parts run together with the vagal nerve through the jugular foramen before innervating the sternocleidomastoid muscle and the trapezoid muscle.

Author's response: This comment also addresses the anatomy of structures involved in scapular winging. As described in our response (above) to the Reviewer's comment #1, we have augmented the topical information presented in the Introduction and added some notes in relation to the anatomy involved:

"The trapezoid muscle is innervated by the spinal accessory nerve, a cranial nerve which originates from the first five to six spine segments before entering the cranium through the foramen magnum (Ramus externus or Radices spinales) and is then accompanied by its cranial part that originates from the oblongata medulla (Ramus internus or Radices craniales). Both parts run together with the vagal nerve through the jugular foramen, before innervating the sternocleidomastoid muscle and the trapezoid muscle. Contributions to

trapezius innervation by the cervical plexus have also been described but findings thus far suggest it has limited significance [8]

Reviewer's comment #3: Polyphasic motor unit potentials in electromyographic testing typically signal regeneration. Please clarify.

Author's response: We have addressed this point in the revised manuscript.

"Electromyographic testing typically shows resting denervation potentials, decreased motor unit recruitment, and polyphasic motor unit potentials during volitional activity[17, 18] if any recovery is taking place."

Reviewer's comment #4: Please introduce shortly the score system you used.

Author's response: We have addressed this point in the revised manuscript.

"The patient underwent evaluation of overall function of the shoulder using the Constant-Murley score (CMS; a 100-point scale composed of several parameters that define the level of pain, function, range of motion and strength[21]). The patient's preoperative CMS was 19.5."

Reviewer's comment #5: Please include into the key words: dorsal scapular nerve, nerve paralysis, osteomuscular flap, rhomboid muscles, scapular winging, trapezoid muscle.

Author's response: These words have been included.

Reviewer's comment #6: Please give a reference when mentioning the first known scientific description of scapular winging.

Author's response: The appropriate reference has been added.

Reviewer's comment #7: Please check the references according to the Journal Style Guidelines.

Author's response: We have carefully checked the references and ensured that they meet the journal's style of presentation.

Reviewer's comment #8: Minor points: a) Introduction, line 23: Please change to '... usually involving the long thoracic nerve, the accessory nerve or the dorsal scapular nerve.'; b) Case report, line 34: Change to '... from its insertion at the spinal processes...'; c) Case report, line 49: Change to 'The scapulothoracic joint was controlled postoperatively with a brace' and give the full name of the state North Carolina; d) Case report, line 55: Specify the automated dynamometer you used. e) Case report, line 68: Change to 'Shoulder motion was measured preoperatively and in the follow-ups.'; f) Discussion, line 32: Insert a full-stop after et al.'

Author's response: All changes suggested for a), b), c), e) and f) have been made. For d) The instrument (microFET®2; Hoggan Scientific LLC., Salt Lake City, Utah, United States) has been specified in the revised manuscript.