128 - UNBALANCES IN COMPLEX OSTEOMUSCULARES THE SHOULDER OF PRACTITIONERS OF SWIMMING

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INTRODUCTION

The swimming has been advocated as an excellent way to improve the physical condition, because it allows developing Resistance, muscular strength and flexibility, in a way that does not require the support of the body, these factors, justifying the medical profession to defend as the "best" form of exercise for people with musculoskeletal diseases and other medical problems, chronic (BAUM, 2000; MAGLISHO, 1999).

However, they support the idea that this method may present some disadvantages, such as: the occurrence of failures in implementing the technical gesture of births, which would cause an inadequate mobilization of the joints, and the fact not capitalize on the physiological effects of hydrostatic pressure.

For Marino (1984) and Palmer (1990), things like the flexibility, strength, body composition, the respiratory rate, as well as the dominant side, the alignment of the spine and limbs, and the experiences of practicing driving are crucial in the implementation of technical gesture of births.

The Crawl, backstroke and butterfly, for example, incorporating a complex set of movements of the shoulder, which can overload the musculoskeletal system for swimmers, especially the muscles from the waist scapular, which act as a combined source of strength and stability (HAMILL, 2001).

According to Bienfait, (1995 apud Neto, Pastre and Monteiro 2004), the muscular imbalance is defined as a disorder of the musculoskeletal system, which can result in compensatory movements, seeking an adaptive response to this disharmony. While motor dysfunction, for Sahrmann (2005), are minor changes or deviations in precision movements, resulting in stock compensation, in certain directions, causing imbalances and musculoskeletal or micro.

However patterns of movement repeatedly failures may influence or compromise the muscle balance, posture and alignment of the members, encouraging pathophysiological processes, which related to musculoskeletal imbalances, excessive overhead, structural and functional characteristics of the individual and improper posture habits can cause pain on the shoulder of practicing swimming (Buss, 2004; HAMILL, 2001).

As Beerkman, Hay (1988) and Campos (2000), the most common cause of chronic pain in the shoulder joint is called the impact syndrome, or syndrome of the shoulder of the swimmer, resulting from repetitive compression of the muscles of the rotator cuff, which triggers anger Chronic inflammation and humeral head, with consequent fibrosis and eventual collapse musculoligamentar.

In this context, this study aims to, the occurrence of musculoskeletal imbalances in the shoulder complex of practicing swimming and identify postural deviations and the more failures occurring in the implementation of the technique of swimming crawl. And, although not propose to correlate the failures in implementing the technique of swimming to the origin of musculoskeletal imbalances, can be analyzed and make a few comments to that effect.

MATERIALS AND METHODS

This study is descriptive character with cross-probability sampling not accidental. Study participants were 10 practitioners of the gyms and swimming clubs from Montes Claros, Minas 4.58 years and 7 men with 24 Gerais, and 3 women with an average age of 23 6.92 years, with six to twelve months of practice and regularity three times a week.

The search went through examination and approval of the ethics committee on research, case 227, the State University of Montes Claros, in accordance with Resolution 196/96 CNS item II.11. The subjects evaluated responded to a form of interview, aiming identity, history and issues concerning the practice of swimming and signed a free free and informed consent.

After a week of observation in swimming classes, and analysis of film images, obtained with the brand Panasonic digital camcorder, two pathways to crawl 25m, after 50 meters of heating, identified and pointed in form, the flaws in the implementation of technical the swim crawl. These images were evaluated on a qualitative observation, supported by technical criteria drawn from models cited by Maglisho (1999), Catteau; Garoff (1990), Palmer (1990) and Makarenko, (2001).

The sample was subjected to further tests of postural assessment, evidence of muscle function and muscle tests in length, according to criteria cited by Kendall, McCreary and Provance (1995). These tests were performed by a single evaluator, and recorded by digital photography and filming. To carry out these tests were used: perpendicular, board grid of Adams (simetrógrafo), dermographic pencil, ruler flexible, universal goniometer and CARCI form or roadmap for evaluation.

The tests, footage and photographs enabled the occurrence of postural deviations, failures in implementing the technical gesture of swimming crawl and musculoskeletal imbalances in the shoulder complex, the subjects of the study, and subsidized discussions on biomechanics of swimming through the analysis of a case Clinical named in this study as a separate case 1, thus emphasizing the principle of biological individuality, to discuss the etiology of musculoskeletal disorders and the interrelationship between the variables involved in the problem of study. The selection of drive-1 case occurred in relation to the individual presenting the 2 failures in implementing the technique of swimming crawl and the most common musculoskeletal imbalances in the sample studied.

The analysis was performed using descriptive statistics, frequency distribution of the variables and percentage of relative frequency valid.

PRESENTATION AND DISCUSSION OF RESULTS

To detect the occurrence of musculoskeletal imbalances in the shoulder complex of practicing swimming, tests were applied to assess posture, muscle length and muscle function in 10 people from a universe of 15 athletes from the swimming clubs and gyms of Clubs of Montes Claros.

Table 1 - Descriptive statistics on the percentage of valid frequency as the variable change in posture segments spine, scapular waist and the shoulder joint.

Changes posture	Number of individuals	Percent relative frequency
Anteriorization head of the humerus	10	100%
Shoulders depressed	8	80%
Internal rotation of the humerus	5	50%
Rotation bottom of the scapula	5	50%

Source: Data collected by the author.

The forward positioning of the head of the humerus, usually associated with internal rotation, may encourage excessive medial rotation during the early entry of swimming crawl causing impaction on the shoulder. For Sahrmann (2005) and Hamill (2001) that is the result of imbalances between medial and lateral rotators, which may limit the movements artrocinemáticos, causing tendinopathy in the shoulder joint.

The situation of alignment of shoulder depressed is the abduction of the glenohumeral joint, due to shortening of the deltoid muscles and above prickly and-or stretching the upper trapezius muscle. In this situation, during the abduction, the degree of lifting the waist scapular needs exceed the normal elevation in order to offset the initial alignment fail, otherwise the increase does not reach the ideal level. This change may determine fault in the technique of swimming crawl. Such as anticipation of the lifting of the shoulder, ie the elevation that should occur during the stretch, occurs at the entrance, going to happen during the release at the beginning stage of recovery. This alignment can cause compression of the tendon and muscle above-thorny, as a result of (1) sliding top of the head of the humerus, (2) lack of sliding during flexion and abduction of the shoulder or (3) external rotation inefficient.

The position of rotation of the lower scapula is a result of the shortening of the muscles lift the scapula and rhomboid and / or weakness of Serratus, trapeze top and bottom, limiting the motion of the scapula, causing overload in the glenohumeral joint (SOUZA, 2003; SAHRMANN, 2005) . In this situation there may be tilting torso to the opposite side elevation of the shoulder and coracoacromial impact, specifically during the recovery and entrance of the crawl swim in accordance with reports of Hamill 2001.

Table 2 - Descriptive statistics on the percentage of valid frequency imbalances related to the variable length muscle in the upper segment.

Muscle length	Nÿ of individuals	Percent relative frequency
Elongation of the external shoulder rotators	6	60%
Shortening of the muscle large dorsal	5	50%
Shortening the internal rotators of the shoulder	5	50%
Pectoral less Shortening	5	50%

The frequent request of the muscles of the humerus internal rotators during the swim crawl favor the stiffness and / or the shortening of these muscles.

The large dorsal and pectoral greater act as internal rotators and can collaborate in the glenohumeral joint dysfunction. Right now next to the scapula and into the humerus and can thus interfere with the pace escapuloumeral. When these muscles shortened limit the necessary external rotation of the humerus, during the final third of flexion of the shoulder. This rotation is of fundamental importance in the process of stretching the arm, and the passage of hyperextension to abduction of the shoulder during the recovery of swimming crawl. That is cause for shortening impact on the shoulder joint.

The lengthening of the external shoulder rotators favors the position of internal rotation of the humerus, usually pronounced, when linked to the abduction of the scapula, which may limit some movements artrocinemáticos, causing stress the muscles of the rotator cuff.

Table 3 - Descriptive statistics on the percentage of valid as variable frequency muscle function in the upper segment.

Muscle Function	Of individuals	Percent relative frequency
Weakness trapeze below	10	100%
Weakness of the deltoid muscle	9	90%
Weakness of rhomboid and lift the scapula	8	80%
Weakness of external rotators of the shoulder	7	70%

Source: Data collected by the author.

The weakness of the posterior deltoid muscle allows the predominance of minor and infraspinatus muscles round traction determining the head of the humerus and glenoid toward external rotation pure, unlike what happens when dominates the deltoid, because the shoulder often enter into with sliding extension of the head ahead of the humerus (KENDALL; McCreary; Provanco, 1995; HAMILL 2001).

According to Hammer (2003) the weakness of the lower trapezius limits the top of the rotation scapula during flexion / active abduction of the glenohumeral joint, this occurs with greater glenoumerais request of the muscles, for example, anterior and middle deltoid, pectoralis major, thus accentuating , Moving artrocinemática and lower stress in the capsule. Such changes may also be the cause of compensatory movements of the torso, for example, tilting to the side.

The shooting and qualitative observation, supported by technical criteria drawn from models cited by Maglisho (1999), Catteau; Garoff (1990), Palmer (1990) and Makarenko, (2001), detected the flaws most occurring in the implementation of the art of swimming crawl.

All individuals of the sample showed flaws in the implementation of the technique of swimming crawl, with most occurring: cross-entry in 40% of cases, flat stage of support (60%), legs short (40%) and breathing chin / shoulder (40 %).

In order to confront the etiology of some motor disorders with some technical flaws in the swim crawl, was randomly set a case study representative.

Unit case 1 - 2 The individual shows no history of musculoskeletal pain, but has some imbalances and postural

changes, among them: shoulder depressed, that the second Sahrmann (2005), usually indicates a lengthening of the upper trapezius, so that the action lack of muscle can void the lifting of the scapula during shoulder flexion and abduction and / or compromising the position of the cervical spine during rotation movements of the head, and therefore, advisable to hold bilateral flexion of shoulder. This can be done, for example, through simultaneous flexion of the arms back in the swim, which enables stabilize the cervical spine and strengthen the trapezius muscles, lift the scapula and Serratus at the end of flexion of the shoulder. This individual has also shortening of the large dorsal muscles, internal rotators of the shoulder (more round, subscapular, pectoralis major and anterior deltoid) and pectoralis minor, favoring the depression of the scapula that contributes to the stress on joints and glenohumeral esternoclavicular in motion abduction and flexion of the shoulder. It also has, below the scapular rotation, which according to Kisner and Colby (2005) and Hammer (2003), may result from shortening of the levator scapulae muscles and rhomboid and / or weakness of Serratus, trapeze top and bottom. The unit-case 1 showed evidence of the weakness of trapezius muscle function below, which could help in this position and impede the necessary escapular rotation top of the scapula during the movements of bending and / or abduction of the shoulder, and there may be insufficient movement of scapular depression during the end of the range of motion. The completion of two legs per cycle of arms associated with the left sided breathing, rhythm (2x1) quoted by Palmer (1990), produces an excessive rotation of the trunk, which can contribute to the deterioration of the left thoracic scoliosis also identified during the evaluation. In this situation, the individual presents convexity left side and rotation of the vertebrae on the left, so as to realize the pattern of breathing that will strengthen the right side of the large dorsal accentuating this imbalance.

The individual, still has accentuated lumbar lordosis, which according Kendall, McCreary and Provanco (1995), can relate to the shortening of eye muscle, a muscle highly sought during the extent of the shoulder, so much required in stages of breast stroke and Propellant beginning of recovery, besides the hamstrings by the movement of legs. This shortening associated with abdominal elongated may limit the flexion / abduction of the shoulder during the breast stroke in crawl style, creating a pelvic anteversion, stressing the lumbar lordosis, leading to a posture of hip deep during the swim. The unit-case 1 showed in the evaluation of the technique of swimming crawl, make recovery lateralized, which Maglisho second (1999), is a failure characterized as a movement of abduction with inadequate external rotation is vital to release the head of the humerus. The elbow is extended, being held down, move over, it increases the arm of resistance and muscular effort, and may determine impaction in the shoulder joint.

FINAL CONSIDERATIONS

The study based on sampling shows a significant occurrence of musculoskeletal imbalances in the shoulder complex of practicing swimming and failures in implementing the technique of swimming crawl, thus reflecting the lack of programs for training geared to improve the biomechanics of technical gesture of swimming And prevent imbalances. Imbalances identified most frequently related to postural changes, among these: anteriorization the head of the humerus, shoulders depressed, inward rotation of the humerus and scapula bottom of the rotation, or changes in the function as: weakness of the posterior deltoid muscles, spinner's side shoulder, lift the scapula and rhomboid and trapezius lower, and the muscle length as: shortening of the large dorsal muscles, internal rotators of the shoulder and chest and lower stretch of the external rotators of the shoulder.

The proposed study is to correlate the technical flaws in the origin of certain imbalances, but to analyze the technical gesture of swimming crawl and biomechanics of the shoulder complex, it was found that some failures as recovery lateralized, putting cross-breathing chin / shoulder with lateral inclination and unilateral breathing can increase the stress in the glenohumeral joint, which can translate into tendinopathy and / or impacts and complex pain in the shoulder. And even increase the burden on the intervertebral discs due to the rotation and lateral inclination.

However the results of the study and literature can say that the correct technique does not guarantee the accuracy of imbalances, but can be a preventative aspect when linked to the correction of certain changes posture. Therefore it is necessary to respect the individuality and use of biological parameters goals, including analysis and assessment of postural muscle length and the pace escapuloumeral and a multi professional, to better guide the prescription and teaching of swimming, preventing the complex pathophysiology the shoulder of its practitioners and improving the quality of life.

Finally, believe to be relevant for studies that aim to compare people idle and practicing swimming on the occurrence of musculoskeletal imbalances and an experimental program allowing exercises that can contribute effectively to prevent the same. For such research is suggested to use a larger sample, involving other age groups.

Key words: Osteomuscular unbalance, postural deviation, swimming.

REFERENCES

BAUM, G. Aquaeróbica: Training Manual. 1st ed. Sao paulo: Manole, 2000.

BEEKMAN, KA; HAY, JG Characteristics of the front crawl techniques of swimmers with shoulder impingement syndrome. Journal of Swimming Research. v.4, n.3, p.11-14. 1988.

BROWN, B. D; Jupiter, J. B; LEVINE, A. M; TRAFTON P. G. Trauma of the musculoskeletal system. Sao paulo: Manole, 2000.

BUSS, G. L. Proposal for preventive laceration in the rotator cuff of swimmers. Brazilian journal Science and Movement. Brasilia, v.12, n.3, P39-45, in September 2004.

CAMPOS, P. S. Shoulder of swimmer - Review of Literature. Magazine Physiotherapy Brazil, v.3, n.3, p.192-196, May / June 2002.

CATTEAU, R. GAROFF, G. The teaching of swimming. Sao paulo: Manole, 1990. p. 20 - 76

HALL, C. M; BROODY, L. T. Therapeutic exercises in the search function. Rio de Janeiro: Guanabara Koogan, 2001. p. 131 - 137.

HAMMER, W. I. Functional soft tissue examination and treatment by manual methods: New perspectives. Rio de Janeiro: Guanabara Koogan, 2003. Cap.3.

HAMILL, J; KNUTZEN, K bases Biomechanics of Human Movement. Sao paulo: Manole, 2001. cap.5 - 7

KENDALL, F. P; McCreary, E. K; Provanco, P. G. Muscles, and evidence functions. 4th ed. Sao paulo: Manole, 1995. p. 27 - 118.

KISNER, C. Colby, L. Therapeutic exercises. Sao paulo: Manole, 2005. Cap.15.

MAGLISHO, E. W. Swimming even faster. Sao paulo: Manole, 1999. Cap.15-21

Makarenko, L. P. Swimming: Selection of sporting talents and initiation. Porto Alegre: Artmed, 2001. Chapter 1.

MARINO, M. Profiling swimmers. Clinical Sports Medicine. v.1, n.3, p.211-229. 1984.

NETO, J.; Pastre, C. M.; MONTEIRO, H. L. Changes in posture of male Brazilian athletes who participated in tests of

muscle power in international competitions. Rer. Bras. Méd. Sports, v.10, n.3, Maynooth, May / Jun 2004.
PALMER, M. L. The science of teaching of swimming. Sao paulo: Manole, 1990.
SAHRMANN, S. A. Treatment and diagnosis of syndromes of motor dysfunction. Santos: ed. Santos, 2005.
SOUZA, P. M. Design and development of a device to measure isometric strength of the shoulder rotators, Ribeirao Preto: Dissertation Masters - School of Engineering of San Carlos / Faculty of Medicine of Ribeirao Preto / Institute of Chemistry of San Carlos, University of São Paulo, 2003.

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IMBALANCES IN COMPLEX OSTEOMUSCULARES THE SHOULDER OF PRACTITIONERS OF SWIMMING

The swimming stands out as an excellent way to improve the physical condition. Although the intense and repetitive movements may cause osteomuscular unbalance. Considering the principle of biological individuality and the fact that physical exercises aim to maintain health, this study is proposed to check the occurrence of osteomuscular unbalance in the shoulder complex of practicing swimming, confronting the etiology of these disorders with some flaws in the implementation of biomechanics swimming crawl. There was a sample of three women with ages averaging 23 ± 4,58 and seven men averaging 24 ± 6,92, with at least 6 months of practice three ice a week, enrolled in clubs and gyms of Montes Claros. These individuals were subjected to posture assessment, tests on muscle length, evidence of muscle function and evaluation of the technique of swimming. The results revealed that there is significative occurrence of osteomuscular unbalance in the shoulder complex of swimmers with postural changes such as forward positioning of the anteriorization on humerus head in (100%) of individuals, depressed shoulders and humerus internal rotation (80%) and inferior rotation of scapula (50%), besides the changes on function as weakness, (90%) with posterior deltoid muscle weakness, lateral rotators of shoulder (70%), lift the scapula and rhomboid (80%) and inferior trapezium at 100% Of the cases, and muscle in length, (50%) with muscular length from the major dorsal muscles, intern rotators of shoulders and minor chest (60%) with strengthen of the external rotators. The results of the study and literature can say that the correct technique does not guarantee the accuracy of imbalances, but it is a preventive aspect when combined with a previous assessment and correction of certain changes or inappropriate posture habits.

Key words: Osteomuscular unbalance, postural deviation, swimming.

LES DÉSÉQUILIBRES DANS COMPLEXE OSTEOMUSCULARES L'ÉPAULE DE PRATICIENS DE LA NATATION

La piscine se fait remarquer comme un excellent moyen d'améliorer la condition physique. Mais l'intensité des mouvements répétitifs peuvent causer un déséquilibre musculaire hypothèse. Considérant que le principe de l'individualité biologique et le fait que les exercices physiques visent à maintenir la santé, cette étude est proposé pour vérifier l'apparition de déséquilibres musculo-squelettiques à l'épaule complexe de la pratique de la natation, face à l'étiologie de ces troubles avec certaines lacunes dans la mise en œuvre de la biomécanique natation exploration. L'échantillon se composait de 6,92 4,58 ans et sept hommes avec 24 trois femmes avec un âge moyen de 23 ans, avec plus de six mois de pratique régulière de la natation et au moins trois fois par semaine, inscrits dans les collèges et les clubs de Montes Claros. Ces personnes ont fait l'objet d'évaluation de la posture, des essais sur la longueur du muscle, la preuve de la fonction musculaire et de l'évaluation de la technique de la natation. Les résultats ont révélé qu'il existe une grande apparition de déséquilibres musculo-squelettiques à l'épaule complexe de pratiquer la natation avec des modifications posturales, tels que le positionnement en avant de la tête de l'humérus en (100%) des individus, des épaules et déprimé rotation interne de l'humérus (80%) et de la rotation bas de l'omoplate (50%), en plus de changements à la lumière, (90%) avec postérieur du muscle deltoïde faiblesse, fileuse côté de l'épaule (70%), un ascenseur et l'omoplate en losange (80%) et inférieur à trapezius (100% Des cas), et des muscles en longueur, (50%) avec un raccourcissement des muscles grand dorsal, interne rotateurs de l'épaule et à la poitrine et la plus faible (60%) avec des rotateurs de l'épaule de forme allongée. Les résultats de l'étude et de la littérature peut dire que la bonne technique ne garantit pas l'exactitude des déséquilibres, mais il s'agit d'un aspect préventif lorsqu'il est combiné avec une précédente évaluation et la correction de certaines modifications ou inapproprié habitudes de posture.

Mots clés: les déséquilibres musculo-squelettiques, les déviations posturales, de la natation

DESEQUILIBRIOS EN COMPLEJO OSTEOMUSCULARES EL HOMBRO DE LOS PROFESIONALES DE LA NATACIÓN

La natación se destaca como una excelente manera de mejorar la condición física. Sin embargo, la intensa movimientos repetitivos pueden causar desequilibrio muscular hipotéticamente. Considerando que el principio de individualidad biológica y el hecho de que los ejercicios físicos tienen por objeto mantener la salud, este estudio se propone comprobar la aparición de trastornos musculoesqueléticos desequilibrios en el hombro complejo de la práctica de natación, frente a la etiología de estos trastornos con algunas deficiencias en la aplicación de la biomecánica natación rastreo. La muestra constaba de tres mujeres con una edad media de 23 ± 4,58 y sete hombres con 24 6,92 años, con más de seis meses de práctica regular de la natación y al menos tres veces a la semana, matriculados en colegios y clubes de Montes Claros. Estas personas fueron sometidas a la postura de evaluación, las pruebas de longitud muscular, las pruebas de la función muscular y la evaluación de la técnica de natación. Los resultados revelaron que existe una significativa incidencia de los trastornos musculoesqueléticos desequilibrios en el hombro complejo de la práctica de la natación con los cambios posturales tales como la posición adelante de la cabeza del húmero en el (100%) de los individuos, los hombros y deprimido la rotación interna del húmero (80%) y la rotación parte inferior de la escápula (50%), además de los cambios en la luz, (90%), con posterior debilidad del músculo deltoides, ruleta lado del hombro (70%), levantar la escápula y romboidal (80%) y menor en trapezius (100% De los casos), y el músculo en longitud, (50%), con el acortamiento de los músculos gran dorsal, los conflictos internos de los rotadores del hombro y el pecho y baja (60%), con exterior de los rotadores del hombro alargada. Los resultados del estudio y la literatura puede decir que la técnica correcta no garantiza la exactitud de los desequilibrios, pero es un aspecto preventivo cuando se combina con una evaluación previa y corrección de ciertos cambios o inapropiados hábitos de postura.

Palabras clave: Trastornos musculoesqueléticos desequilibrios, las desviaciones posturales, natación.

DESEQUILÍBRIOS OSTEOMUSCULARES NO COMPLEXO DO OMBRO DE PRATICANTES DE NATAÇÃO

A natação destaca-se como uma excelente forma para melhorar o condicionamento físico. Porém, os intensos movimentos repetitivos podem hipoteticamente causar desequilíbrios musculares. Considerando o princípio da individualidade biológica e o fato de que exercícios físicos objetivam a manutenção da saúde, este estudo se propôs a verificar a ocorrência de desequilíbrios osteomusculares no complexo do ombro de praticantes de natação, confrontando a etiologia desses distúrbios com algumas falhas na execução biomecânica do nado crawl. A amostra constou de três mulheres com idade média de 23 4,58 anos e sete homens com 24 6,92 anos, com mais de seis meses de prática de natação e regularidade mínima de três vezes por semana, matriculados em academias e clubes de Montes Claros. Estes indivíduos foram submetidos à avaliação postural, testes de comprimento muscular, provas de função muscular e avaliação da técnica de nado. Os resultados revelaram que existe significativa ocorrência de desequilíbrios osteomusculares no complexo do ombro de praticantes de natação, com alterações posturais como: anteriorização da cabeça do úmero em (100%) dos indivíduos, ombros deprimidos e rotação interna do úmero (80%) e rotação inferior da escapula (50%), além de alterações na função, (90%) com fraqueza nos músculos deltóide posterior, rotadores laterais do ombro (70%), rombóides e elevador da escápula (80%) e trapézio inferior em (100%) dos casos, e quanto ao comprimento muscular, (50%) com encurtamento dos músculos grande dorsal, rotadores internos do ombro e peitoral menor e (60%) com rotadores externos do ombro alongados. Os resultados do estudo e a literatura pesquisada permitem dizer que a técnica correta não garante a correção de desequilíbrios, porém é um aspecto preventivo quando associada a uma avaliação previa e à correção de determinadas alterações ou hábitos posturais inadequados.

Palavras-chave: Desequilíbrio osteomuscular, desvio postural, natação.