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Retrospective Study Regarding Artistic Gymnastics Injuries

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Abstract

The aim of this study is to identify the most relevant issues raised regularly on injuries in artistic gymnastics, issues disseminated in current studies, in electronic databases. In order to achieve this work we chose the Pubmed basis and a total of 45 studies within it. Based on gymnastics, injury, male, female keywords, we identified, in the afore mentioned database, a number of 638 articles, published during 1965-2013. The studies, on which the systematic review was conducted, highlight a varied Artistic Gymnastics etiopathology, located at the muscular level and at the main joints.

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Keywords: Artistic gymnastics, injuries, sports performance, male, female;

1. Background

In Peter Werner’s opinion (2012) gymnastics may be considered as other childhood activities, and may be globally defined as any physical exercise on the floor or apparatus even that the athletes have to learn how to develop locomotor and balance skills, body and spatial awareness, and endurance, strength, flexibility, agility, coordination, and body control as well (Werner, Williams and Hall, 2012). Today performance gymnastics experiences a particular dynamics, being considered to be a sport of physical and mental limit for those who practice it, and a show at the same time, which also has reached a very high level of development, the exercises impressing both through the difficulty of their component elements, their combinations, and through the virtuosity of the executions and the elegance of movements (Grigore, 2001).

Given these features of the artistic gymnastics, the large number of technical elements and the raised difficulty, the literature signals a large number of injuries, both during training and in competitions. Thus, a systematic review of four electronic databases, PubMed, Embase, Cinahl, and SportDiscus show that from a total of 89

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articles on 23 sports disciplines (including gymnastics) the most frequently studied injuries are Achilles tendinopathy, plantar fasciitis, and stress fracture (Sobhani et al., 2012). At the same time, the scientific literature signals the fact that there are more than 5 million participants in 1 of 6 gymnastic disciplines that are prone to spinal cord injuries (Edlich et al., 2010). In this sense, Purcell and Micheli (2009) state that low back pain in young athletes is a common complaint and should be taken seriously. Also, a prospective one-year epidemiological study on 155 gymnasts show that injuries are predominantly localized to the lower extremities (64%) for the whole population of gymnasts (Bak et al., 2007).

2. Material and method

2.1. Objective of the study

The systematic review of data obtained from study publication aimed to obtain better informations of the injuries in gymnastics. The purpose of the paper was to identify the most relevant studies on the types of injuries in male and female artistic gymnastics.

2.2. Searching criteria

PubMed was searched using the following keywords: „injuries”, „gymnastics”, „women gymnastic”, „men gymnastics”. Thus, we have identified a number of 638 articles published during 1965-2013.

2.3. Inclusion criteria

The review included studies which have had as an objective the highlighting of the gymnastics injuries types, regardless of age, sex, level of injuries production (figure 1).

2.4. Study characteristics

![](image_url)

Fig 1. Flow chart of study selection process
The characteristics of the studies on which the systematic review of the publications in the database has been conducted highlights a wide range of injuries in artistic gymnastics, irrespective of age, gender or level of training gymnasts (table 1).

Table 1. Systematic review of injuries in gymnastics. Study characteristics and results

<table>
<thead>
<tr>
<th>Study</th>
<th>Type of study</th>
<th>Number of participants</th>
<th>Type of injuries identified</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauer S, Dunne B, Whitewood C. (2012)</td>
<td>Case study</td>
<td>A 13-year-old female gymnast</td>
<td>Elbow dislocations</td>
<td>Bilateral simultaneous elbow dislocations are extremely rare and have only been described in 12 cases.</td>
</tr>
<tr>
<td>Lund S.S., Myklebust G. (2011)</td>
<td>Cohort study</td>
<td>17 competitions, n=8418 athlete-exposures (A-Es)</td>
<td>49 (43%) acute injuries, 58 (50%) exacerbations and eight (7%) reinjuries</td>
<td>The injury incidence was 50.3/1000 h or 6.8/1000 A-Es. Ankle injuries accounted for 25.6/1000 h.</td>
</tr>
<tr>
<td>Kauther M.D, Rummel S, Thobe B., Hussmann B., Nast-Kolb D., Wedemeyer C. (2011)</td>
<td>-</td>
<td>260 wheel gymnasts, who trained the &quot;hip roll&quot; element</td>
<td>Elbow injuries</td>
<td>60.4 % of the gymnasts reported changes of the elbow region.</td>
</tr>
<tr>
<td>Purnell M, Shirley D, Nicholson L, Adams R.(2010)</td>
<td>Retrospective injury and training survey</td>
<td>73 acrobatic gymnasts (69 female) aged 8-26 years</td>
<td>knee, ankle and wrist</td>
<td>Half (50.7%) of the participants had sustained an injury associated with acrobatic gymnastics in the past 12 months. Risk factors for injury were having an age of &gt;=13 years and training for &gt;=8 h per week at age 11 years.</td>
</tr>
</tbody>
</table>

3. Discussion

We argue that Artistic Gymnastics is one of the sports in which the exposure to injury is very common, this is due to the technical complexity of the elements and structures, to the complexity of the effort of the body over the performance also to the presence of the working apparatus. At the same time, the amendments to the requirements for participation in competitions, to the criteria for evaluation, and to the domestic and international competitive system were due to gymnastics development trends that have highlighted the difficulty of the bonds, and combinations and exercises.
Through its fundamental characteristics of contest with oneself, with others or with the environment, performance sport represents a situation of confrontation and risk. This aspect supports the role and importance of specific methods and procedures / the sport branch in the modeling of such situations, and of sport psychology theory and methods applied in traumatology.

Given these characteristics, both athletes and coaches must know very well some aspects of the phenomena that occur in tissues following trauma in sports. The affected tissues are very sensitive and thus require immobilization by fixing through swaddle, other or plaster casts to keep the affected segment from any other injury that would delay the recovery process. An important role in such situations is performed by the sports doctor or the physical therapist that joins the entire team and gives the first aid in case of fractures, sprains, wrenches (reduction, immobilization, orthotics) and is qualified to perform small surgical treatments and infiltrations.

Also, the intense connection of the psychological factors with the physiological ones became very evident in professional sport in general and in artistic gymnastics in this case because "the management of trauma healing claims a multidisciplinary treatment" (Cordun, 2006). The psychologist and the coach are the ones who can ensure the athlete with an optimal state for performance during high level competitions.

An important factor in such cases is represented by accident prevention measures, both in training and in sport competitions. In this respect, the athletes must acquire knowledge on: the consequences of injuries occurred during training or competitions, and the acquisition of skills and abilities in the use of exercise as a means to prevent these injuries. In artistic gymnastics athletes learn from the beginning processes of self-insurance and self-help, so that accidents occur as infrequently as possible. The coaches are meant to comply with the planning and periodization of sports trainings to prevent injuries that can occur both during training and during the competitions, an essential factor in preparing the body for effort (limber up). However, the physical training of gymnasts must be directed to those specific or nonspecific gymnastics means that can contribute, through a proper, effective and original monitoring of each gymnast workout, to a neuromuscular and joints processing meant to support a specific intense effort.

We believe that, regardless of the cause of accidents during sports competitions, this leads to a disruption of the body structure as a whole, including the motivational system for athletic performance. The reliability and accuracy of the treatments and rehabilitation measures in such situations cause the maintaining of the high motivational level and the resumption, as soon as possible, of the sports activity, be it in the gym or in competitions.

4. Conclusions

As has been observed in the systematic review of the studies, most accidents happen during the limber up [7], and the most common injuries are reported in the elbow (Bauer, Dunne, & Whitewood, (2012); Kauther et al., 2011) knee, wrist and ankle (Purnell et al., 2010). Also, it was found that during competitions, the wrist is exposed to many different types of stresses, such repetitive motion, high impact loading, axial compression, torsional forces, and distraction in varying degrees of ulnar or radial deviation and hyperextension (Webb et al., 2008). Factors significantly associated with wrist pain included higher skill level, older age, and more years of training (DiFiori et al., 2002). Other types of injuries reported in medical studies are those of the spine (Kruse & Lemmen, 2009). The authors do point that the causes low back pain are spondylosis, Scheuermann's disease, intervertebral disc pathology. It is re noted that there were no reported differences in injury according to sex.

We recommend that rehabilitation programs be made up on timing trauma, from pre-trauma phase and to the resume of the competitive activity. An important role, in this respect, is held by experience from training and competitions, involving approach and reconsideration of training and competitions through critical analysis, objective, in terms of emotional security. According to several specialists in the field (Hichey, 1979; Suinn, 1980; Milkes, 1987; Heil, 1993) in order to limit injuries occurred during competition or training, medical recovery activities should be conducted on the basis of principles and rules (apud Cordun, 2006). In this respect, the
British Association of Sports and Exercise Medicine provides some excellent courses at basic, intermediate and advanced levels which include sports physiology and nutrition, correct orthopaedic examination and management (BASEM, 2013).

Finally we recommend the implementation of a profilactic education programme of athletes targeting at the diminishing the number of injuries, like in the countries holding important results in world gymnastics.

References


