

Pain Prevalences and Analgesic Use in Junior Athletes – a Recent Narrative Review

Schmerzprävalenzen und Analgetikakonsum bei Nachwuchsleistungssportlern – ein aktueller narrativer Überblick

Summary

- **Problem:** Children and adolescents are exposed to high peak loads at an early age in junior competitive sports. Little is known in this age group about the injury-free occurrence of pain and the sport-related consumption of painkillers.
- **Methodology:** Narrative review with multivariate and paired keyword search for studies that evaluated localization-dependent, injury-free prevalence of pain, analgesic use, and determinants of use in junior competitive sports.
- **Results:** Derived from the few existing studies, a pronounced willingness to participate in competitions and training despite pain ("playing hurt") is found in junior competitive sports among injury-free junior athletes. Analogous to adult competitive sports, analgesics, especially from the group of non-steroidal anti-inflammatory drugs, are used at an early stage. Especially in adolescents with increasing performance progress, in particular female athletes, the use of analgesics for joint pain has been documented. The consumption takes place for the compensation of post-exposure pain conditions but also prophylactically. The use of analgesics and the decision to take them are influenced by the immediate care environment in 2/3 of cases. A physician is involved in only 1 of 3 analgesic use decisions.
- **Discussion:** For exertional pain, a displacement mentality exists among many stakeholders in the junior setting. There is early, with age increasingly uncritical and excessive analgesic use. This consumption behavior harbors a high potential for abuse due to self-defined indications, procurement, dosage and duration of use. There is an individual need for a stronger appreciation of pain conditions by the caregivers in junior competitive sports with early consultation with a doctor, combined with the question of how much pain is allowed.

KEY WORDS:

Pain Prevalences, Analgesics, Children And Adolescents, Sports

Introduction

Children and adolescents are subjected to high stresses in the systematic training of junior competitive sports due to, on the one hand, early sport-specific stresses and, on the other hand, the often simultaneous multiple practice of sports. The effects on the musculoskeletal system, which is still growing, are at best the desired physiological, sport-specific adaptations,

Zusammenfassung

- **Problem:** Kinder und Jugendliche werden im Nachwuchsleistungssport frühzeitig hohen Spitzenbelastungen ausgesetzt. Wenig ist in dieser Altersgruppe über das verletzungsfreie Auftreten von Schmerzen und den sportbegleitenden Konsum von Schmerzmitteln bekannt.
- **Methodik:** Narrativer Review mit multivariater und gepaarter Schlagwortsuche für Studien, die im Nachwuchsleistungssport die lokalisationsabhängige, verletzungsfreie Prävalenz von Schmerzen, den Einsatz von Analgetika und die Determinanten des Konsums evaluierten.
- **Ergebnisse:** Abgeleitet von den wenigen existierenden Studien findet sich im Nachwuchsleistungssport unter den verletzungsfreien Nachwuchsathleten eine ausgeprägte Bereitschaft zur Teilnahme an Wettkämpfen und Training trotz Schmerzen („playing hurt“). Analog dem erwachsenen Leistungssport werden bereits früh Analgetika, besonders aus der Gruppe der nichtsteroidalen Antiphlogistika eingesetzt. Gerade bei Adoleszenten mit zunehmendem Leistungsfortschritt, insbesondere weiblichen Athleten ist ein Schmerzmittelgebrauch bei Gelenkschmerzen belegt. Der Konsum erfolgt zur Kompensation von postexpositionellen Schmerzzuständen aber auch prophylaktisch. Bezug und Einnahmeentscheidung sind zu 2/3 durch das unmittelbare Betreuungsumfeld beeinflusst. Nur in 1 von 3 Entscheidungen zum Analgetikakonsum ist ein Arzt involviert.
- **Diskussion:** Für Belastungsschmerzen besteht im Nachwuchsbereich eine Verdrängungsmentalität bei vielen Beteiligten. Es kommt frühzeitig, mit dem Alter zunehmend zu einem unkritischen und übermäßigen Analgetikakonsum. Dieses Konsumverhalten birgt ein hohes Missbrauchspotenzial durch selbstdefinierte Indikation, Beschaffung, Dosierung und Dauer der Einnahme. Es bedarf individuell einer stärkeren Würdigung von Schmerzzuständen durch die Betreuenden im Nachwuchsleistungssport mit früher Arztkonsultation, verbunden mit der Frage wie viel Schmerz ist erlaubt.

SCHLÜSSELWÖRTER:

Schmerzprävalenzen, Schmerzmittel, Kinder und Jugendliche, Sport

but at worst local overloads and structural damage (15). Pain indicates these stress situations acutely but also chronically. Pain prevalences in connection with sports stress are also a strong indicator of an increased risk of injury (1). The transitions from overload to structural damage are fluid and often elude imaging procedures in the still reversible early phase. ➤

REVIEW

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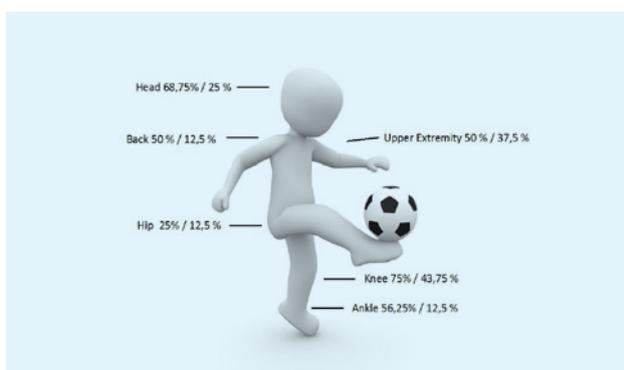


Figure 1

Prevalence of pain in male junior soccer players from the German national squad (U12) according to localization with 12-month prevalence / 7-day prevalence.

Data on the often early and in such phases permanent use of painkillers are known from competitive sports (14). However, the practice of taking painkillers for supposed preventive benefit, which has been common until amateur sports, is also well documented in adult sports (3,11). International campaigns have warned for years against the uncritical and excessive use of non-steroidal anti-inflammatory drugs (13).

However, the situation is aggravated especially in children and adolescents by the fact that the medical care structure is often less developed and coordinated than in adult competitive sports, while at the same time the young athletes have little opportunity for self-determination. Under these circumstances, the all too uncritical and unsuspecting use of “self-tracking” software and hardware solutions with the aim of self-optimization can also be a dangerous temptation to the uncritical use of painkillers. Against this background, the personality development of young athletes can be considerably negatively influenced.

In this context, the current children’s and youth sports report of the German government’s sports committee formulates the so-called newer sports development in connection with the social value of sport as one of its three guiding principles on its main topic of “health, performance and society”. Against the background of the idea of performance, this includes existential questions of danger and integrity for sport, such as dealing with drug abuse in junior competitive sport (22).

Methodology

A paired keyword search was performed on pubmed for the terms “pain prevalence”, “analgetics”, “painkillers”, “pain management”, “young elite athletes”, “youth sports” and “children”. Included were studies whose collectives were without exception young elite sports. Mixed collectives with young adults were excluded as well as collectives from recreational and popular sports. Only the data on pain prevalences of injury-free athletes were valid. Information on pain had to be provided in relation to location and context as well as ordinally scaled to intensity on the VAS. A polytopic classification including at least all large joints and joint regions was obligatory. The painkiller consumption of the athletes was to be listed at least separately according to preparations or drug classes and frequency of use. As known from the few previous studies, very few data exist on the use of analgesics for joint pain in children and adolescents in sports (10).

Results

Pain Prevalences

Diehl et al. (2019) reported that more than 43% of German junior athletes in Olympic sports participate in competitions even with pain. Schneider et al. (2019) evaluated competition participation despite pain in 34% of all injury-free players over the course of a season in junior performance basketball players in the highest German division. 2 out of 3 junior basketball players also stated that they continued to train even when in pain. An average of 1.6 joint regions were affected, mostly in the lower extremity. The intensity of the pain in competition phases (peak pain) was given on average as 3 to 5 on the visual analog scale (VAS). Preventive approaches known from competitive sports, in particular through in-season strength training to strengthen resilience, were able to achieve pain modulation with a reduction in prevalence, but only of the so-called peak pain (2).

The cross-season prevalence of joint pain, especially in the lower extremity, was age-independent and, most importantly, sex-unspecific in junior basketball players. This is all the more remarkable, since against the background of the known sex-specific differences in fatigue monitoring with regard to the functionality of the stressed neuromuscular structures a difference in the course of the season would be expected (4, 16). Only the prevalence of shoulder pain was significantly higher in female basketball players during the season. In addition to the high prevalences for joint pain, a relatively high, gender-unspecific prevalence for headaches was also impressive (18). For female basketball players, Garbenyte-Apolinskiene et al. (2019) were able to confirm these data in their collective with a prevalence for pain of injury-free female players of over 46%, 30% of which was lower extremity joint pain and 10% headache. Our own study results on the prevalence of pain in male junior soccer players from the systematic national squad development (U16) also show increased pain prevalence among the injury-free athletes both in the short term in competition phases (7-day prevalence) and in the long term over the course of the year (12-month prevalence), emphasizing the lower extremity (figure 1, figure 2).

Analgesic Use

The use of analgesics by children and adolescents has been documented in few studies so far, but nevertheless for both therapeutic and supposedly preventive purposes with a high prevalence. For example, Tscholl et al. (2009) found an average of 0.63 drug intakes per player per match among junior professional soccer players during World Cups. 38.9% of all medications taken were painkillers of the non-steroidal anti-inflammatory drug type (COX-2 inhibitors). 17.3% (U17) and 21.4% (U20) of the male junior players took at least 1 painkiller before each match, and 8.9% of them took at least 2 different painkillers per match. There was no significant association of intake with registered injuries or between starting players and substitutes (21).

Among German junior basketball players (aged 13-19 years), 84.1% reported taking painkillers occasionally and 40.1% frequently during the season. On average, 1.74 drugs were taken, and 2.07 were taken frequently. There was, as in Tscholl et al, a higher consumption with increasing age. Mostly non-steroidal anti-inflammatory drugs were used. With occasional use 66% ibuprofen and 48% diclofenac (combination possible), with frequent use 21% diclofenac and 16% ibuprofen. This showed that pain medication use was significantly more frequent among female basketball players than male basketball players (96.2% vs. 79.1%, $p=0.004$). No association was found with injury status

or current pain status. Pain medication use without limiting symptoms was reported by 13.2%, and 4.9% reported using it prophylactically to prevent pain. In 2 out of 3 cases, the decision to take painkillers is made by the young athlete and his or her immediate environment (parents). Only in 1 out of 3 cases a physician is involved in the decision and thus also in the dosage planning. In the case of multiple mentions in the same study, more than 90% of the athletes stated that the immediate environment also represents the primary source of supply for the medication; only 4 out of 10 athletes receive their medication primarily or once in the course from a physician (18).

Discussion

Pain is a warning signal of the body. It signals stress and, with further intensity, also limits, the transgression of which does not remain without consequences in the short or long term.

The evaluated results show a very high prevalence of pain among injury-free children and adolescents in junior competitive sports and an unguided use of painkillers.

The relevance of pain for society as a whole has been highlighted frequently, particularly in view of the economic consequences, so that national efforts are already being made to optimize prevention, early diagnosis and differentiated therapies of pain conditions (5).

However, systematic monitoring, especially in junior sports, does not yet exist.

The question of how much pain is permissible, especially in junior competitive sports and among children and young people who are active in sports, must be answered by society as a whole, also in order to strengthen the importance and acceptance of sports.

Highly acute and persistent pain conditions affect adolescents in a physically and psychologically vulnerable phase. The perception and especially the communication of pain conditions is often difficult for young athletes due to the still widespread assumption that pain is part of sports and even part of the development of top athletic performances. The concept of "no pain - no gain" is often formulated in this regard (19). Against this background, supported by both intrinsic (ambition) and extrinsic (coaches, trainers, parents) motivation, there is evidence that children and adolescents are highly willing to play in pain, the so-called "playing hurt" phenomenon (12, 17).

Similarly to competitive sports, there is no uniformly standardized pain management or evidence-based and established coping strategies in youth sports to guide young elite athletes.

Current studies evaluating the care environment find large gaps for optimal management in this regard due to lack of education, training, and information for the stakeholders involved (23). This is being addressed by the IOC and others in consensus meetings (9). The athletes themselves, when asked about support in their self-determined decision-making for upcoming treatments, would also like more advice on the topic of "stress" (41.2 %) and on "sports injuries" (81.3 %). The need for information about short- and medium-term risks of analgesics is shown by the uncritical and excessive use of analgesics under the false assumption of a synergistic effect of analgesic combinations of the same drug class and the idea to compensate for pain in training or competition by pre-exposure to analgesics (18). When it comes to the use of analgesics, it is therefore of great concern among young athletes that only one third of all athletes consult a physician who is involved in the decision and ultimately the dosage of the medication. The guiding principle of the current children's and youth sports report of the German

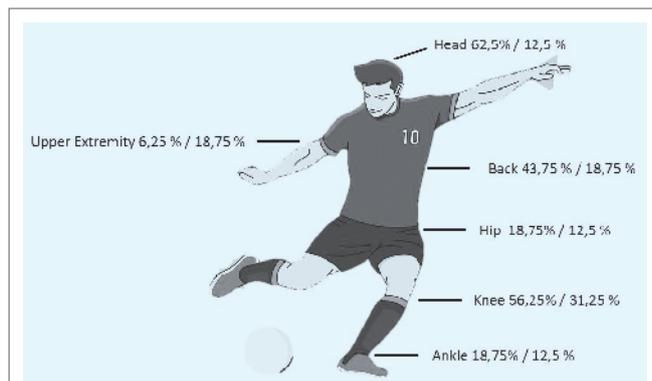


Figure 2

Prevalence of pain in male junior soccer players from the German national squad (U16) according to localization with 12-month prevalence / 7-day prevalence.

government's sports committee on the recent development of sports with the question of a dangerous misuse of drugs in the youth sector due to a socially misguided conception of values in sports is therefore correct and important. The study results confirm this and therefore suggest for daily training work a greater appreciation of pain conditions by those caring for junior athletes, better education of athletes about painkiller use and consequences, and early involvement of physicians in treatment.

Limitations

Per se, the study design of a narrative review limits the objectivity due to a subjective selection bias. On the other hand, the number of studies evaluating the polytopic prevalence of pain and analgesic use in children and adolescents in competitive sports is already small. The above-mentioned survey studies have in common that they have a social desirability bias, which can lead to an underrepresentation of socially undesirable answers. This was countered by appropriate plausibility checks by the software packages used. A further limitation is that the indication of pain is subject to a recall bias, especially for longer periods (one year).

Conflict of Interest

The authors have no conflict of interest.

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