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CONTRIBUTIONS OF THE AXIAL AND SAGITYAL TORQUES OF THE TRUNK TO THE FORWARD DISPLACEMENT OF THE LOWER LIMB AT DIFFERENT RUNNING SPEEDS

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Background: Trunk axial and sagittal torques have been studied as important motors for lower limb movements in tasks such as kicking. Trunk torques are potential contributors to lower limb forward displacement during the swing phase of running in the kinetic chain. In the swing phase of running, the lower limb is initially accelerated forward and subsequently decelerated before contact with the ground. The torques produced by the trunk muscles could contribute, together with the muscles of the lower limb joints, to this function, being important to avoid overloading the muscles of these segments during running. However, there are no investigations in the literature about the contributions of trunk torques to lower limb advancement in running.
Objectives: The aim of the study is to understand the accelerations caused by the axial and sagittal torques of the trunk on the segments of the lower limb, during running, at different speeds.
Methods: Three running cycles with the right lower limb at speeds of 2m/s, 3m/s, 4m/s and 5m/s were used to perform the induced acceleration analysis in the OpenSim software. The sample consisted of ten experienced, healthy male runners. Data were collected on an instrumented treadmill at Stanford University's Human Performance Laboratory and are freely available. A model of the musculoskeletal system allowed estimating the accelerations caused by joint torques in body segments. The anteroposterior accelerations of the thigh, shank and foot segments, induced by axial and sagittal torques of the trunk and sagittal torques of the hip, knee and ankle, were computed. For each segment, the movement was divided into acceleration and deceleration phases. The percentage of the total acceleration induced by the torques was determined by means of the positive and negative integral.
Results: Axial trunk torque was the main inducer of thigh acceleration (63% to 67%), while sagittal trunk torque was the main inducer of deceleration (45% to 57%), at all running speeds. For acceleration and leg deceleration, the hip in the sagittal plane was the main inducer torque (67% to 82%), while for the foot, the sagittal ankle torque was the main acceleration inducer (39 to 49%), while the sagittal torque of the knee was the main deceleration inducer (95% to 98%) The contribution pattern remained independent of running speed.
Conclusion: It is concluded that the trunk axial and sagittal torques contribute to the acceleration and deceleration of the thigh, which is the segment with the greatest mass and inertia of the lower limb, regardless of running speed.
Implications: The study helps in understanding human movement by exploring the effects of torques on joints and segments distal to them. Thus, trunk torque production deficits could overload hip flexor and extensor muscles to accelerate and decelerate the thigh. The study serves as a basis for intervention studies on the trunk and running performance.
Keywords: Running, Trunk, Induced acceleration analysis

Conflict of interest: The authors declare no conflict of interest.
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EPIDEMIOLOGICAL PROFILE AND MAIN MUSCULOSKELETAL INJURIES THAT AFFECT BODYBUILDERS

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Background: It is known that bodybuilding is a safe and effective way to perform exercises, although it is not risk-free. Its main risks for the musculoskeletal system revolve around joint overloads through repetitive use and failure in technical execution. Bodybuilding is one of the most common forms of physical activity. In view of this prior context and the lack of information about injuries suffered by bodybuilders, it is necessary to identify their possible risk factors, which may contribute to injury prevention planning in the future.
Objectives: The objective of the present study was to identify the sociodemographic and epidemiological profile of bodybuilders, as well as the main injuries affected in this public.
Methods: An observational, cross-sectional study was carried out. An online questionnaire was applied through the google forms platform, the inclusion criteria being Residents of the state of São Paulo, who practice bodybuilding in the state of São Paulo on a recreational or professional basis between 18 and 65 years old. The SPSS software was used to calculate the average and percentage in the presentation of the results.
Results: The study analyzed the results of 100 bodybuilders, predominantly aged between 18 and 25 years, most of whom were students or professionals in the field of biological sciences (47%), sleeping more than 6 hours a night (64 %), training in large branches (54%) 3 or 5 times a week (59%) with the main objective of hypertrophy (49%). The prevalence of injuries was 43%, with the shoulder (51%), lumbar spine (39.5%) and knee (27.9%) being the most affected site. 51% of the injuries are classified as overload injuries, reaching yet another profile of practitioners who set up their own training (46.5%).
Conclusion: The sociodemographic and epidemiological profile of bodybuilders in the study was homogeneous between genders, aged between 18 and 25 years, with a height of 1.69 m and a predominantly overweight BMI. Bodybuilding or +1 associated sport was practiced, who slept more than 6 hours a night with a hypertrophy goal. The prevalence of injuries among bodybuilders was 43%, with the most affected sites being the shoulder, lumbar spine and knee.
Implications: The study brings epidemiological data and musculoskeletal injuries in gym practitioners and their training routine, being important to understand the public due to the scarcity of