

from the injury. BB and meniscal/cartilage lesions were analyzed on MRI, while a video analysis of mechanisms of ACL injury and injury dynamics were assessed from the videos.

Results The most common pattern of BB present in 8 cases (53%) was a femoral BB >5 mm in the central portion of the lateral femoral condyle and in the posterior portion of the lateral tibial plateau. In all these cases, the injury occurred with single-leg load during a pivoting maneuver while changing direction during pressing (33%), dribbling (7%), goalkeeping (7%) or in response of being being tackled on the upper body (7%). All these injuries occurred without direct contact, high horizontal speed and with an abducted hip.

Other patterns included BB only in tibia (20%), tibia and femur BB <5 mm (7%) or no BB (20%). In these cases, injury occurred due to direct contact (20%), recovery balance after kicking (13%) or jumping (7%), and while tackling (7%).

Conclusions A characteristic and well-defined BB pattern, with BB in both tibia and femur, was identified in ACL injuries without direct contact and while the football players had single-leg loading while pivoting trying to perform a sudden change of direction.

402

LATERAL-HEEL RELEASE-SETTINGS FOR SPECIAL SKI-BINDINGS

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Background Lateral-heel ski-binding release is favorably associated with the attenuation of combined abduction-moment/torsional-tibia-torque developed during Slip-Catch trauma on skis - which combined-loading is associated, biomechanically, with ACL injury.

Objective Derive a range of lateral-heel release-settings indexed to a range of 'torsional-tibia-torque release-settings' (torsional-settings). Hypotheses: a range of torsional-settings can be indexed to a range of lateral-heel release-settings to mitigate ACL injuries on skis.

Design, Setting

Biomechanical, Observational. International alpine skiing-binding test-method standards were expanded to include measurement of lateral-heel release. The toe-piece of the binding was calibrated to produce a range of torsional-settings as a function of a range of body-weights. A range of lower-leg lengths (denoted between the distal-heel and the centre of the knee) were culled from gender-specific biometric data, matched to body weights. Adding lower-leg length to boot-sole thickness, binding and ski-thickness - a range of 'total-length abduction-lever-arms' (TLALA) were matched to the range of body-weights. Lateral-heel release was hunted by adjusting the lateral-heel release-mechanism such that when (a) abduction-force was applied 5cm aft ward of a range of 'transition points' ('transition-point' = TLALA transposed horizontally to rear-portion of ski), lateral-toe release occurred; and when (b) abduction-force was applied 5cm forward of the transition-points, lateral-heel release occurred. Lateral-heel release-force was measured by a transducer positioned on the ski at the projected interface of the boot-sole/ski-binding heel.

Patients None.

Interventions Additional lateral-heel release-settings.

Main Outcome Measurements Lateral-heel release-force.

Results

Abstract 402 Table 1

Torsional-tibia | Lateral-heel release
release-torque | (force) setting [daN]
[daNm] | Females - Males

3.0 | 12 - 18
4.0 | 20 - 24
5.0 | 25 - 28
6.0 | 30 - 32
7.0 | 35 - 37
8.0 | 40 - 40

Conclusions A range of lateral-heel release (force) settings were indexed to a range of standardized torsional-settings. A prospective intervention study is needed to correlate lateral-heel release to a mitigation of ACL injuries.

403

INCIDENCE OF PEDIATRIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTIONS IN NORWAY FROM 2005 TO 2019

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Background The incidence of paediatric anterior cruciate ligament (ACL) reconstructions is increasing in the USA and Australia, but the incidence in Norway is unknown. The health burden regarding short- and long-term complications from ACL injury is high, and there are also risks of complications associated with reconstructions.

Objective The primary aims were to determine the incidence of paediatric ACL reconstructions in Norway and to detect changes in incidence during the past 14 years.

Design Retrospective observational register study.

Setting Data were retrieved from the nationwide Norwegian Knee Ligament Register (NKLR) which collects data on all cases of ACL reconstructions in Norway.

Patients (or Participants) Girls aged 14 years or younger, and boys aged 16 years or younger, with primary ACL reconstruction registered between January 2005 and December 2019.

Main Outcome Measurements Annual incidence of paediatric ACL reconstructions, stratified by age and sex.

Results For boys, the annual incidence increased from 21 per 100,000 in 2005 (95% CI, 15–27) to 30 in 2019 (95% CI, 23–37). For girls, the incidence increased from 14 (95% CI, 9–19) to 28 (95% CI, 20–36). A total of 26,106 patients (all ages) underwent ACL reconstruction between 2005–2019. Of these, 818 (3.1%) were boys, and 470 (1.8%) were girls. The mean age at time of surgery was 15.3 years (SD 0.94) for boys, and 13.7 years (SD 0.57) for girls. Of the surgically treated patients, 55.6% (455) of the boys were 16 years of age, and 77.4% (364) of the girls were 14 years of age. The sports where most injuries occurred were football, handball and alpine.

Conclusions The annual incidence of paediatric ACL-reconstructions in Norway increased from 2005 to 2019. ACL injury imposes an increasing health burden on the young population which warrants further attention - especially regarding prevention.

404

HIGH INCIDENCE OF ANTERIOR CRUCIATE LIGAMENT INJURIES WITHIN THE TWO FIRST MONTHS OF THE SEASON IN AMATEUR TEAM BALL SPORTS

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Background The incidence of anterior cruciate ligament (ACL) injuries is commonly reported as an annual rate. There is relatively little information about their seasonal aspects.

Objective The aim was to analyze the distribution of ACL injuries during the season in amateur football, handball and basketball. It was hypothesized that ACL injuries they were more common after the summer break in comparison to the rest of the season.

Design Retrospective case series

Setting Hospital-based registry

Patients Three hundred and seventy-one (282 males, 89 females) injuries were included according to the following criteria: ACL injury occurring in football (n=258), handball (n=56) or basketball (n=57) and confirmed through clinical examination, MRI and arthroscopy where applicable, under 35 years of age and pre-injury participation in competitive sport.

Interventions (or Assessment of Risk Factors) Gender; age; sport at injury; injury mechanism; previous or contralateral ACL injury.

Main Outcome Measurements The injury occurrence during the calendar year was divided into six periods of two months. Segment 1 (S1) represented the first two months after summer break (Football: September/October, handball/basketball: October/November).

Results The occurrence of ACL injuries differed significantly between segments ($p < 0.01$) and according to sports ($p < 0.01$). Almost one third occurred in S1 (n=104; 28%). The distribution was similar in other segments (S2: 13%, S3: 16%, S4: 16%; S5: 12%, S6: 15%). Fewer ACL injuries occurred in S2 in football (9%) compared to basketball (23%) ($p < 0.05$). More ACL injuries occurred in S5 in football (17%) compared to handball (2%) and basketball (2%) ($p < 0.05$).

Conclusions The majority of ACL injuries in amateur football, handball and basketball sports occurred immediately after the summer break in the first two months of the season. This indicates that amateur athletes should start ACL injury prevention programs before the start of the season to allow for gradual increases of load.

405

PATIENTS WITH KNEE INJURY HAVE WORSE POSTURAL ORIENTATION THAN HEALTHY CONTROLS

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Background Patients with knee injury appear to have worse postural orientation (i.e., alignment between body segments), at the knee, measured with gold standard three-dimensional motion analysis, compared with controls. However, there is a lack of studies on postural orientation for other joints than the knee, e.g., hip and trunk, as well as with a clinically applicable method.

Objective To investigate whether visual assessment of Postural Orientation Errors (POEs) differs between patients with anterior cruciate ligament reconstruction (ACLR) and healthy controls.

Design Cross-sectional study

Setting Clinical setting

Participants Inclusion criteria were: age 18–39 years, >16 weeks post-ACLR, and initiated jumping exercises. Fifty-three patients with ACLR (45% women), mean age 26.7 (SD 6.5) years, and 30 controls (50% women), mean age 28 (SD 7.9) years, were included.

Interventions Six POEs of the lower extremity and trunk, e.g., knee medial-to-foot position and femoral valgus, were visually assessed as good, fair, or poor, from video-recordings of 5 functional tasks. A score from 0 (good) to 100 (poor) was calculated for two subscales; activities of daily living (ADL) (single-leg squat, stair descending, forward lunge) and Sport (single-leg hop, side-hop), and a Total POE score (all 5 tasks). The injured leg was assessed in patients, and the right leg in controls.

Main Outcome Measurements POE scores

Results Patients with ACLR had significantly worse POE scores compared with controls, POE subscale ADL (ACLR: median 18.5 (quartiles 11–26), controls: 11 (3.7–14.8), $p = 0.0001$), POE subscale Sport (ACLR: 26 (16.7–29.6), controls: 7.4 (3.7–15.7), $p = 0.0001$), and Total POE score (ACLR: 23.2 (14.3–25.9), controls: 8 (5.4–16), $p = 0.0001$).

Conclusions Patients with ACLR appear to have worse postural orientation, measured with visual assessment, compared with controls. Visual assessment of POEs could be used to guide injury treatment aimed at improving postural orientation before return to sport, and potentially also to guide prevention training.

406

DOES SOMATOSENSORY DYSFUNCTION EXIST AT RETURN TO PLAY FOLLOWING CONCUSSION IN ELITE ATHLETES

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Background A growing body of evidence suggests athletes may be over two times more likely to sustain a musculoskeletal (MSK) injury following concussion, highlighting significant clinical need to understand the pathophysiological changes in function and guide long term management of these patients. Reduced somatosensory function is considered one potential influencing factor for this phenomenon, whereby decreased postural control and bodily awareness leads to poor technique or abnormal movement strategies

Objective Using a measure of postural sway (Sway medical app, SMBA) and a balance assessment marker (Y-balance) this study aims to establish if somatosensory function is reduced at the point or return to play in a group of elite athletes.