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IS PLAYING POSITION, PLAYING STANDARD OR LENGTH OF PLAY ASSOCIATED WITH JOINT SPECIFIC OSTEOARTHRITIS IN CRICKETERS?

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Abstract:

Purpose: Significant joint injury sustained during sport, increases the likelihood of an individual developing osteoarthritis (OA) in the future. However, it is not clear if other sport-related factors, such as playing position, playing standard or length of play, are related to OA after adjusting for injury.

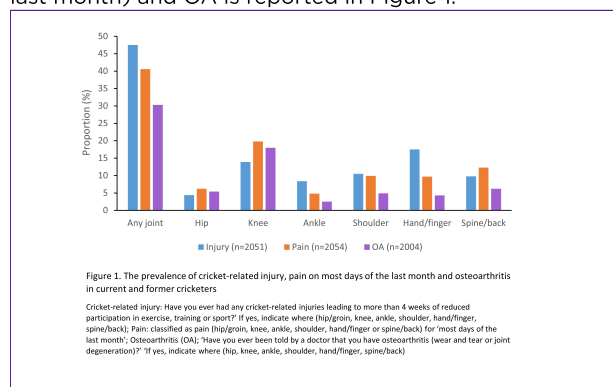
This study aimed to determine whether cricket-related factors (playing position, playing standard and length of play) are associated with OA in current and former cricketers.

Methods: 28,152 current and former cricketers aged ≥ 18 years, who were registered on an online database managed by the England and Wales Cricket Board, received one email inviting them to complete an online questionnaire. 2598 people were eligible and gave informed consent.

For the current study, individuals must have played ≥ 1 season of cricket and be aged ≥ 30 years (since OA was the outcome of interest). OA was assessed by asking participants if they had 'ever been told by a doctor that they had osteoarthritis (wear and tear or joint degeneration),' and the specific joint(s) involved. Explanatory variables were: predominate playing position/s (all-rounder, batter, wicketkeeper, bowler), total seasons played, and highest standard of play ('lower standard': village/social or university/school vs. 'higher standard': academy/county age, county/premier league or international). 'Don't know' responses were coded as missing data.

Logistic regression assessed the relationship between cricket-related factors and OA, for any joint and each specific joint. Crude and adjusted odds ratios (OR) and 95% confidence intervals (CI) were estimated. All analyses were adjusted for cricket-related injury (joint specific cricket-related injury leading to more than 4 weeks of reduced participation in exercise, training or sport) and length of play was adjusted for age and cricket-related injury. All underlying assumptions were met. Interaction terms were tested between cricket-related factors and playing status (current or former) and no interactions were found.

Results: The 2068 participants who met the eligibility criteria were aged a mean 55 ± 12 (range 30-94) years, had a mean BMI of 28.1 ± 4.9 and 2% were female ($n=48$). 56% were current cricket participants and 44% were former cricket players. Participants had played cricket for an average of 31 ± 15 seasons. 815 (39%) identified as an all-rounder, 764 (37%) as a batter, 367 (18%) as a wicketkeeper and 617 (30%) as a bowler. The prevalence of cricket-related injury, pain (on most days of the last month) and OA is reported in Figure 1.



After adjusting for injury, all-rounders had a 1.3 (95% CI: 1.0, 1.5) times greater odds of having any OA, a 1.3 (1.0, 1.6) times greater odds of having knee OA and a 1.5 (1.0, 2.3) times greater odds of having shoulder OA, compared to other positions (Figure 2). Batters had a 40% reduced odds of shoulder OA compared to other positions. Wicket-keeping or bowling was not associated with OA in the adjusted analysis. Results remained consistent following a post hoc sensitivity analysis excluding participants who selected more than one playing position. After adjusting for injury, people who had played cricket at a higher standard had a 1.4 (1.1, 1.7) times greater odds of having any OA, a 1.3 (1.0, 1.6) times greater odds of having knee OA and a 1.6 (1.0, 2.4) times greater odds of having shoulder OA, compared with people who had only played cricket at a lower standard. After adjusting for age and injury, length of play was only associated with back/spine OA, whereby playing for an additional 4 seasons corresponded to an 8% reduced odds of back/spine OA (Figure 2).

	All-rounder	Batter	Wicketkeeper	Bowler	Higher playing standard	Length of play (4 year intervals)
Any joint						
Crude OR	1.3(1.1, 1.6)**	0.8(0.7, 1.0)*	1.0(0.8, 1.3)	1.0(0.8, 1.2)	1.5(1.2, 1.8)***	1.10(1.07, 1.13)***
Adjusted OR	1.3(1.0, 1.5)*	0.8(0.7, 1.0)	1.1(0.8, 1.4)	0.9(0.7, 1.1)	1.4(1.1, 1.7)***	1.00(0.97, 1.03)
Hip						
Crude OR	1.4(0.9, 2.0)	0.8(0.5, 1.2)	0.7(0.4, 1.3)	1.0(0.7, 1.6)	1.5(1.0, 2.2)*	1.09(1.03, 1.15)**
Adjusted OR	1.4(1.0, 2.1)	0.8(0.5, 1.2)	0.8(0.5, 1.4)	1.0(0.7, 1.6)	1.4(0.9, 2.1)	0.98(0.92, 1.04)
Knee						
Crude OR	1.2(1.0, 1.6)	0.8(0.7, 1.1)	1.1(0.8, 1.5)	0.9(0.7, 1.1)	1.4(1.1, 2.7)**	1.09(1.05, 1.12)***
Adjusted OR	1.3(1.0, 1.6)*	0.9(0.7, 1.1)	1.1(0.8, 1.6)	0.8(0.6, 1.0)	1.3(1.0, 1.6)*	1.00(0.96, 1.04)
Ankle						
Crude OR	1.6(0.9, 2.8)	0.6(0.3, 1.1)	0.5(0.2, 1.3)	0.6(0.3, 1.1)	0.6(0.3, 1.1)	1.11(1.03, 1.21)**
Adjusted OR	1.7(1.0, 3.0)	0.6(0.3, 1.1)	0.5(0.2, 1.4)	0.6(0.3, 1.1)	0.6(0.3, 1.1)	1.01(0.93, 1.11)
Shoulder						
Crude OR	1.6(1.1, 2.4)*	0.5(0.3, 0.8)**	0.5(0.3, 1.0)*	1.2(0.8, 1.9)	1.7(1.1, 2.6)**	1.04(0.98, 1.10)
Adjusted OR	1.5(1.0, 2.3)*	0.6(0.4, 0.9)*	0.5(0.3, 1.0)	1.1(0.7, 1.7)	1.6(1.0, 2.4)*	0.97(0.91, 1.04)
Hand/finger						
Crude OR	0.9(0.6, 1.4)	1.4(0.9, 2.1)	1.5(0.9, 2.6)	0.8(0.5, 1.3)	1.2(0.8, 1.8)	1.06(1.00, 1.13)*
Adjusted OR	0.9(0.6, 1.4)	1.4(0.9, 2.1)	1.6(0.9, 2.6)	0.8(0.5, 1.3)	1.2(0.7, 1.8)	0.94(0.88, 1.00)
Back/spine						
Crude OR	1.4(1.0, 2.1)*	0.7(0.5, 1.1)	0.8(0.5, 1.4)	1.3(0.9, 2.0)	1.4(1.0, 2.0)	1.04(0.99, 1.09)
Adjusted OR	1.3(0.9, 1.9)	0.8(0.6, 1.3)	0.9(0.5, 1.5)	1.2(0.8, 1.8)	1.3(0.9, 1.9)	0.92(0.87, 0.98)**

Figure 2. Univariate and multivariate logistic regression investigating the association between cricket-related factors and osteoarthritis in current and former cricketers

*ps<0.05 **ps<0.01 ***ps<0.001; all results are odds ratios (OR) and 95% CIs; playing positions and playing standard were adjusted for cricket-related injury (joint or joint specific as appropriate); length of play was adjusted for age and cricket-related injury; playing standard: higher standard (coded as 1): academy/county age, county/premier league or international vs. lower standard (coded as 0): village/social or university/school; Cricket-related injury: Have you ever had any cricket-related injuries leading to more than 4 weeks of reduced participation in exercise, training or sport? If yes, indicate where; Osteoarthritis (OA): 'Have you ever been told by a doctor that you have osteoarthritis (wear and tear or joint degeneration)?' ' If yes, indicate where

Conclusions: All-rounders had a higher odds of having OA (especially knee or shoulder OA) and batters had a reduced odds of having shoulder OA. A higher playing standard was associated with OA (any joint, knee and shoulder). These associations are unlikely to be explained by cricket-related injury alone. However, the positive relationship between length of play and OA was largely explained by age and injury.

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