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5 **There are more football injury prevention reviews than randomized controlled trials. Time for**
6 **more RCT action!**

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24 **INTRODUCTION**

25 Football is the most popular sport worldwide and participation in football at any level is associated with
26 numerous health benefits.¹ However, participation in football at any level incurs a risk of sustaining
27 musculoskeletal injuries.^{2,3} Effective injury prevention strategies are needed.

28 The first formal injury prevention randomised controlled trial (RCT) in football was published in 1983.⁴
29 We performed a scoping systematic review to provide an overview of the published articles on injury
30 prevention in football.

31 **METHODS**

32 A study protocol is available online at
33 http://findresearcher.sdu.dk/portal/files/134191319/Protocol_scoping_revire_PURE.pdf. Although, we
34 primarily focused on RCTs, we also included systematic reviews, and other studies investigating injury
35 prevention strategies/interventions in football regardless of participant age, sex and level of
36 participation.

37 **RESULTS**

38 Our literature search identified 3131 studies, with 98 studies being included after removal of those
39 studies that did not satisfy the inclusion criteria (Supplementary figure A). Reviews were the type of
40 study most often published (43%), followed by RCTs (35%), cohort studies (20%), and surveys (2%)
41 (Supplementary figure B). Of the reviews 55% were narrative and 43% were systematic, of which 47%
42 pooled data in the form of a meta-analysis.

43

44 **FIGURE 1.**

45

46 When we assessed the RCTs, exercise-based injury prevention interventions were used in 29 out of 34
47 studies, of which 18 included warm-up exercises, 9 strength training exercises, and 5 balance training
48 exercises. The populations included in exercise-based injury prevention studies were; children (age 8 to
49 12 years) in one study, adolescents (age 13 to 17 years) in 11 studies and adults (≥ 18 years old) in 12
50 studies. Five studies included both adolescent and adult players. Non-elite players were included in 21
51 studies (10 on male players only, 7 on female players only, 3 on male and female players, and finally 1

52 did not report the sex of players). Elite players were included in 7 studies (6 on male players only, and 1
53 on male and female players). One study included both elite and non-elite male players. For an
54 expanded overview see Figure 1 and Supplementary table 1.

55 **DISCUSSION**

56 Regarding the types of studies published on injury prevention in football, there were more reviews than
57 RCTs. Furthermore, the RCTs included heterogenous cohorts, interventions and settings all of which
58 could affect implementation in otherwise homogenous groups of footballers. To our surprise, elite
59 adolescent female players have only been included in one RCT so far. This is alarming as elite
60 adolescent female players have greater risk of overall injuries than elite adult female players ([RR] 1.7;
61 95% CI (1.3 to 2.3)].⁵ To reduce the musculoskeletal injury burden in football, RCTs are needed to test
62 injury prevention strategies in different populations and settings. As an example, the prevalence of ACL
63 injuries amongst non-elite adolescent female football players is very low (<0.5% of all players),⁶
64 whereas the prevalence of these injuries amongst elite adolescent female football players exceeds
65 10% of players.⁵ This highlights an important issue; the majority of studies investigating the efficacy of
66 injury prevention interventions in female football players have not been undertaken on those players
67 with the highest risk of serious injury. We therefore urge the football research community and funders to
68 increase their focus on RCTs, and demand that the target is set on high risk cohorts.

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71 **Figure legends**

72 **Figure 1. Injury prevention randomized controlled trials in football: an overview.** Children=football
73 players from 8 to 12 years old; adolescents=football players from 13 to 17 years old; adults=football
74 players with ≥ 18 years old.

75 **Supplementary Figure A. Flow chart of the included studies.**

76 **Supplementary Figure B. Historical graph reporting the number of publications investigating**
77 **injury preventive strategies from 1983 to March 2018, stratified by publication type.**

78 SR=systematic review; MA=meta-analysis; RCT=randomized controlled trial.

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80 **Supplementary table legends**

81 **Supplementary Table 1. Randomized controlled trials characteristics.** M=Male, F=Female.

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