1   **SUPPLEMENTARY FILE 1**

2   **Literature review**

3   A systematic review covering an unlimited period was conducted by TFM 4th of July

4   2022 in PubMed aiming to identify literature exploring the impact of BC of athletes on

5   performance outcomes. The literature search was repeated 30th of December 2022 to include

6   any recently published literature. Relevant single words and mesh terms in three search

7   strings were combined with AND in the searches: (1) athlete and associated terms, AND (2)

8   different methodology to measure BC, AND (3) performance variables (*see search string and*

9   *filters applied*). The review has not been pre-registered, but protocol can be shared upon

10   reasonable request.

11   The search resulted in 2934 publications, which were imported to the online review

12   program Rayyan.ai (49). Additionally, 4 papers were included from knowledge by the group

13   of authors. Of the total number of imported publications, 130 were identified as relevant by

14   title and abstract, of which finally 29 were included after thorough review. Review studies, or

15   studies of cross-sectional comparative and/or descriptive nature were excluded, as were

16   studies in which results were based on correlation, or where performance measurements were

17   not sport practice specific. Only longitudinal and/or prospective studies with regression

18   analyses or intervention studies were included. One exception was made due to the nature of

19   longitudinal, comprehensive data reporting and impressive longitudinal design; hence

20   included despite no regression analyses, only correlational data. GS checked the review

21   result, i.e., the included studies according to inclusion/exclusion criteria, and assured that

22   included studies were interpreted correctly.

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25 **Search string for first search on BC and performance:**

26 (((((athletes[MeSH Terms]) OR (athletes[Title/Abstract])) AND

27 ((((((Gymnastics[MeSH Terms])) OR (Sports[MeSH Terms])) OR (Football[MeSH Terms])

28 OR (Baseball[MeSH Terms]) OR (Basketball[MeSH Terms]) OR (Wrestling[MeSH Terms])

29 OR (Boxing[MeSH Terms]) OR (Dancing[MeSH Terms]) OR (Mountaineering[MeSH

30 Terms]) OR (Soccer[MeSH Terms]) OR (golf[MeSH Terms]) OR (High-Intensity Interval

31 Training[MeSH Terms]) OR (Hockey[MeSH Terms]) OR (running[MeSH Terms]) OR

32 (Racquet Sports[MeSH Terms]) OR (Skating[MeSH Terms]) OR (Skiing[MeSH Terms]) OR

33 (Swimming[MeSH Terms]) OR (Bicycling[MeSH Terms]) OR (tennis[MeSH Terms]) OR

34 (Mass Lifting[MeSH Terms]) OR (Snow Sports[MeSH Terms]) OR (volleyball[MeSH

35 Terms]) OR (water sports[MeSH Terms]) OR (martial arts[MeSH Terms])) OR

36 (((((((((((((((((((((((((((((((((athletes[Title/Abstract]) OR

37 (sport*[Title/Abstract])) OR (football[Title/Abstract])) OR (basketball[Title/Abstract])) OR

38 (wrestling[Title/Abstract])) OR (boxing[Title/Abstract])) OR (dance*[Title/Abstract])) OR

39 (mountaineering[Title/Abstract])) OR (soccer[Title/Abstract])) OR (golf[Title/Abstract])) OR

40 (gymnastics[Title/Abstract])) OR (high-intensity interval training[Title/Abstract])) OR

41 (hockey[Title/Abstract])) OR (running[Title/Abstract])) OR (raquet sports[Title/Abstract]))

42 OR (skating[Title/Abstract])) OR (skiing[Title/Abstract])) OR (swimming[Title/Abstract]))

43 OR (bicycling[Title/Abstract])) OR (tennis[Title/Abstract])) OR (mass

44 lifting[Title/Abstract])) OR (snowsports[Title/Abstract])) OR (volleyball[Title/Abstract]))

45 OR (watersports[Title/Abstract])) OR (gymnast[Title/Abstract])) OR

46 (runner[Title/Abstract])) OR (cyclist[Title/Abstract])) OR (skier[Title/Abstract])) OR

47 (climber[Title/Abstract])) OR (handball player*[Title/Abstract])) OR (weigth

48 lifter[Title/Abstract])) OR (soccer player*[Title/Abstract])) OR (cross country

49 skiing[Title/Abstract])) OR (long-distance runner*[Title/Abstract])) OR (rhythmic

50   gymnastics[Title/Abstract])) OR (cycling[Title/Abstract])) OR (mass lifter*[Title/Abstract]))

51   OR (mass class athlete*[Title/Abstract])) OR (elite sport*[Title/Abstract])) OR (elite

52   cyclist*[Title/Abstract])) OR (leaness sport*[Title/Abstract])) OR (elite

53   athlete*[Title/Abstract])) OR (endurance-cycling[Title/Abstract])) OR (fitness

54   athletes[Title/Abstract])) OR (alpine*[Title/Abstract])) OR (horse racing[Title/Abstract]))

55   OR (martial arts[Title/Abstract])) OR (triathlon[Title/Abstract]))))) AND

56   ((((((((((((((((((((((Body Composition)[MeSH Terms]) OR (Body Constitution[MeSH

57   Terms])) OR (Anthropometry[MeSH Terms])) OR (Densitometry[MeSH Terms])) OR

58   (Muscle Strength Dynamometer[MeSH Terms])) OR (Electric Impedance[MeSH Terms]))

59   OR (Adipose Tissue[MeSH Terms])) OR (Four-Dimensional Computed Tomography[MeSH

60   Terms])) OR (Absorptiometry, Photon[MeSH Terms])) OR (Heart Rate

61   Determination[MeSH Terms])) OR (Skinfold Thickness[MeSH Terms])) OR (Ideal Body

62   mass[MeSH Terms])) OR (Kinanthropometry[MeSH Terms])) OR (Body Size[MeSH

63   Terms])) OR (Body mass[MeSH Terms])) OR (Body Height[MeSH Terms])) OR (Body

64   Measures[MeSH Terms])) OR (body mass index[MeSH Terms])) OR (Body Water[MeSH

65   Terms])) OR (Body Fat Distribution[MeSH Terms])) OR (Lung Volume

66   Measurements[MeSH Terms])) OR (Magnetic Resonance Imaging[MeSH Terms])) OR

67   (Magnetic Resonance Angiography[MeSH Terms])) OR (Plethysmography[MeSH Terms])

68   OR (Ultrasonography[MeSH Terms]) OR (Ultrasonics[MeSH Terms])) OR

69   ((((((((((((((((((((((dual energy X-ray absorptiometry[Title/Abstract]) OR

70   (DXA[Title/Abstract])) OR (dexa[Title/Abstract])) OR (CALIPER[Title/Abstract])) OR

71   (Harpenden[Title/Abstract])) OR (BMI[Title/Abstract])) OR (Body fat

72   percentage[Title/Abstract])) OR (Resting Metabolic Rate[Title/Abstract])) OR

73   (Bodysize[Title/Abstract])) OR (resting metabolic rate[Title/Abstract])) OR (bone mineral

74   density[Title/Abstract])) OR (Body composition in sport[Title/Abstract])) OR (bioelectrical

75   impedance[Title/Abstract])) OR (BIA[Title/Abstract])) OR (Air displacement

76   plethysmography[Title/Abstract])) OR (Bod Pod[Title/Abstract])) OR

77   (Ultrasound[Title/Abstract])) OR (MRI[Title/Abstract])) OR (CT[Title/Abstract])) OR

78   (anthropometric predictors[Title/Abstract])) OR (hydrostatic weighing[Title/Abstract])) OR

79   (underwater weighing[Title/Abstract])) OR (DPX Absorptiometry[Title/Abstract])))) AND

80   (((((((Athletic Performance)[MeSH Terms]) OR (Physical Fitness[MeSH Terms])) OR

81   (Physical Endurance[MeSH Terms])) OR (Cardiorespiratory Fitness[MeSH Terms])) OR

82   (Muscle Strength[MeSH Terms]) OR (Exercise Tolerance[MeSH Terms])) OR (((((Athletic

83   Performance[Title/Abstract]) OR (Endurance[Title/Abstract])) OR

84   (Performance*[Title/Abstract])) OR (Physical Qualities[Title/Abstract])) OR

85   (Resilience[Title/Abstract])))

86   **Filters applied**

87   Case Reports, Clinical Study, Clinical Trial, Comparative Study, Controlled Clinical

88   Trial, Observational Study, Randomized Controlled Trial, Review, Systematic Review, Meta-

89   Analysis, Humans.