

Supplementary table 1

Study Characteristics

First author, (year)	Constructs	Study type	Population	Assessment time(s) following concussion	Outcome measures
Baracks et al., (2018) ³⁸	Postural stability	Cross-sectional study	93 varsity or club sport collegiate athletes (age = 20.73 ± 1.47, male = 63, female = 30) • 48 SRC group (age = 20.62 ± 1.52) • 45 control group (age = 20.85 ± 1.42)	Within 72 hours	1. RMS sway 2. 95% Ellipse sway area
Lynall et al., (2020) ⁴⁰	Postural stability	Cross-sectional study	30 college-aged recreational athletes (male = 12, female = 18) • 15 concussion group (age = 19.7 ± 0.9) • 15 control group (age = 19.7 ± 1.6)	Median of 126 days [range 28–432 days]	1. Time to stabilization 2. COP path length 3. normalized COP path length 4. COP sagittal plane velocity 5. COP frontal plane velocity 6. COP speed

Murray et al., (2020) ⁴¹	Postural stability	Prospective cohort study	84 college students (male = 62, female = 22) • 42 concussion group (age = 19 ± 1) • 42 control group (age = 18 ± 1)	< 6 months (n = 7), 6–12 months (n = 9), > 12 months (n = 26)	1. COP AP Mean excursion velocity 2. COP ML Mean excursion velocity 3. COP AP root mean square 4. COP ML root mean square
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Rochefort et al., (2017) ⁴²	Postural stability	Cross-sectional study	66 adolescents (male = 21, female = 45) • 33 concussion group (age = 14.2 ± 1.5) • 33 control group (age = 18 ± 1)	Average of 32 days [range 28–40 days]	1. 95% ellipse sway area 2. Mediolateral COP velocity 3. Anterior-posterior COP velocity
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Cochrane et al., (2021) ⁴³	Postural stability	Cross-sectional study	<p>63 adolescent athletes (male = 37, female = 26)</p> <ul style="list-style-type: none"> • 33 concussion group (age = 13.1 ± 2.4) • 30 control group (age = 12.8 ± 3) 	Median of 60 days	<ol style="list-style-type: none"> 1. 95% ellipse sway area 2. Mediolateral COP length 3. Anterior-posterior COP length 4. Mediolateral COP amplitude 5. Anterior-posterior COP amplitude 6. Mediolateral COP velocity 7. Anterior-posterior COP velocity
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Hides et al., (2017) ⁴⁴	Postural stability	Prospective cohort study	<p>54 male elite rugby union league players (age = 24.4 ± 3.9)</p> <p>14 players had a concussion injury, but 3 players had multiple concussions, therefore 11 players included for the analysis</p>	Within 3 - 5 days	<ol style="list-style-type: none"> 1. Sway velocity <ul style="list-style-type: none"> • Single firm • Double firm • Tandem firm • Single foam • Double foam • Tandem foam
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King et al., (2014) ⁴⁵	Postural stability	Cross-sectional study	26 adolescent athletes (male = 6, female = 20) <ul style="list-style-type: none">• 13 concussion group (age = 16.3 ± 2)• 13 control group (age = 16.7 ± 2)	Average of 5 months [range 2–13 months]	1. RMS sway
Howell et al., (2019) ³⁹	Postural stability, and locomotion	Cross-sectional study	114 adolescent athletes (male = 59, female = 55) <ul style="list-style-type: none">• 49 SRC group (age = 14.9 ± 1.9)• 65 control group (age = 14.9 ± 1.6)	Average of 7 days	1. Quiet standing: RMS sway 2. Gait examination: Gait speed

Parrington et al., (2019) ⁴⁶	Postural stability, and locomotion	Prospective cohort study	<p>48 collegiate athletes (Male = 37, Female = 11)</p> <ul style="list-style-type: none"> • 23 concussion group (age = 20.1 ± 1.3) • 25 control group (age = 20.9 ± 1.4) 	Within 24 to 48 hours	<ol style="list-style-type: none"> 1. Quiet standing: RMS sway 2. Gait examination: gait speed
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Howell et al., (2019) ⁵⁰	Locomotion	Cross-sectional study	<p>114 varsity collegiate athletes (male = 67, female = 47)</p> <ul style="list-style-type: none"> • 54 concussion group (age = 20.3 ± 1.1) • 60 control group (age = 18.9 ± 0.7) 	Within 5 days	<ol style="list-style-type: none"> 1. Gait speed 2. Cadence 3. Stride length
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Lynall et al., (2019) ⁵¹	Locomotion	Cross-sectional study	<p>30 college-aged recreational athletes (male = 12, female = 18)</p> <ul style="list-style-type: none"> • 15 concussion group (age = 19.7 ± 0.9) • 15 control group (age = 19.7 ± 1.6) 	Median of 126 days [range 28–432 days]	1. Tendon gait velocity
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Martini et al., (2011) ⁵²	Locomotion	Cross-sectional study	<p>68 college students (age = 20.8 ± 1.9, male = 37, female = 31)</p> <ul style="list-style-type: none"> • 28 concussion group (age = 21) • 40 control group (age = 20.72) 	Average of 6.3 years	<ol style="list-style-type: none"> 1. Time in double leg stance 2. Normalized gait velocity 3. Step length
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Howell et al., (2020) ⁵³	Locomotion	Cross-sectional study	81 youth athletes (male = 36, female = 45) <ul style="list-style-type: none">• 43 SRC group (age = 14.4 ± 2.3)• 38 control group (age = 14.9 ± 2)	Within 14 days	1. Gait speed
Howell et al., (2018) ⁵⁴	Locomotion	Cross-sectional study	64 adolescent athletes (male = 30, female = 34) <ul style="list-style-type: none">• 33 SRC group (age = 15.1 ± 1.8)• 31 control group (age = 14.9 ± 1.8)	Within 14 days	1. Gait speed 2. Cadence 3. Step length 4. Double support time

Pape et al., (2020) ⁵⁵	Locomotion	Cross-sectional study	<p>90 active-duty service members (male = 84, female = 6)</p> <ul style="list-style-type: none"> • 45 concussion group (age = 33.5 ± 6.5) • 45 control group (age = 30.4 ± 7.2) 	Did not report	1. Gait speed
Sambasivan et al., (2015) ⁵⁶	Locomotion	Cross-sectional study	<p>48 children and adolescents (Male = 28, Female = 20)</p> <ul style="list-style-type: none"> • 26 concussion group (age = 13.2 ± 2.2) • 22 control group (age = 13.6 ± 2.6) 	Average of 43 days	<p>1. Gait velocity</p> <p>2. Step length</p> <p>3. Time on double support</p>

Loyd et al., (2022) ⁵⁷	Locomotion	Cross-sectional study	91 Adults (Male = 22, Female = 69) <ul style="list-style-type: none">• 45 concussion group (age = 33.0 ± 9.5)• 46 control group (age = 31.5 ± 9.5)	Within 3 years	1. Gait speed
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Solomito et al., (2018) ⁴⁷	Locomotion	Cross-sectional study	31 Adolescent athletes (Male = 18, Female = 13) <ul style="list-style-type: none">• 16 concussion group (age = 14.6 ± 1.8)• 15 control group (age = 13.8 ± 1.4)	Within 2 months	1. Walking speed
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Stuart et al., (2020) ⁴⁸	Locomotion	Cross-sectional study	<ul style="list-style-type: none"> • 52 concussion group (age =39.6 ± 11.3) • 59 control group (age = 37.0 ± 12.7) 	111 Adults (Male = 40, Female = 71) Average of 551 days [range 283–1013 days]	<ol style="list-style-type: none"> 1. Gait velocity 2. Stride length 3. Time on double support
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Howell et al., (2013) ⁴⁹	Locomotion	Prospective cohort study	<ul style="list-style-type: none"> • 20 concussion group (age =15.3 ± 1.3) • 20 control group (age = 15.6 ± 1.0) 	40 Adolescents (Male = 36, Female = 4) Within 3 days to 2 months	<ol style="list-style-type: none"> 1. Walking speed 2. Step length
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Lee et al., (2021) ¹⁸	Frontal and sagittal plane kinetics, and sagittal plane kinematics	Cross-sectional study	42 adolescent athletes (Male = 12, Female = 30) <ul style="list-style-type: none"> • 21 SRC group (age = 15.4 ± 1.8) • 21 control group (age = 15.4 ± 1.7) 	With 60 days of starting return-to-play progression	1. Internal knee extension moment 2. Internal knee varus moment 3. Sagittal plane knee flexion displacement
Lynall et al., (2018) ⁶⁰	Frontal and sagittal plane kinematics, and trunk mechanism	Cross-sectional study	30 college-aged recreational athletes (Male = 12, Female = 18) <ul style="list-style-type: none"> • 15 concussion group (age = 19.7 ± 0.9) • 15 control group (age = 19.7 ± 1.6) 	Median of 126 days [range 28–432 days]	1. Trunk flexion angle 2. Trunk right lateral flexion angle 3. Hip flexion angle 4. Hip abduction angle 5. Knee flexion angle 6. Knee varus angle
Avedesian et al., (2020) ¹⁷	Frontal and sagittal plane kinetics and kinematics, and impact loading	Cross-sectional study	21 adolescent club athletes (Male = 8, Female = 13) <ul style="list-style-type: none"> • 10 SRC group (age = 13 ± 3) • 11 control group (age = 11.9 ± 3) 	Average of 1.3 years	1. Peak vertical ground reaction force 2. Peak ankle dorsiflexion angle 3. Peak hip flexion angle 4. Peak knee flexion angle 5. Peak knee abduction angle 6. Peak external hip extension moment 7. Peak external knee extension moment 8. Peak external knee abduction moment

Shumski et al., (2021) ⁵⁸	Frontal and sagittal plane kinetics and kinematics, and impact loading	Cross-sectional study	50 recreationally active college students (Male = 24, Female = 26)	Average of 40.5 months	<ol style="list-style-type: none"> 1. Peak vertical ground reaction force 2. Peak loading rate 3. Peak knee flexion angle 4. Peak knee abduction angle 5. Peak external knee flexion moment 6. Peak external knee abduction moment 7. Knee flexion angle 8. Knee varus angle
Dubose et al., (2017) ⁶¹	Sagittal plane kinetics and kinematics	Prospective cohort study	39 Division I collegiate male football players	Average of 49.9 days	<ol style="list-style-type: none"> 1. Hip angle at IC 2. knee angle at IC 3. Ankle angle at IC 4. Peak hip flexion angle 5. Peak knee flexion angle 6. Peak ankle dorsiflexion angle 7. Peak external hip flexion moment 8. Peak external knee flexion moment
Avedesian et al., (2021) ⁵⁹	Frontal and sagittal plane kinetics and kinematics, and impact loading	Cross-sectional study	40 collegiate athletes (male = 18, female = 22)	Average of 461 days	<p>This information was queried from the authors</p> <ol style="list-style-type: none"> 1. Peak vertical ground reaction force 2. Peak knee flexion angle 3. Peak knee abduction angle 4. Peak ankle dorsiflexion angle 5. Peak external knee extension moment 6. Peak external knee abduction moment

Lapointe et al., (2018) ²¹	ACL frontal and sagittal plane kinematics	Cross-sectional study	19 collegiate students (male = 10, female = 9) • 9 concussion group (age = 20 ± 2) • 10 control group (age = 20 ± 2)	Median of 1.7 years [range 0.9-6.5 years]	1. Peak knee flexion angle 2. Peak knee adduction angle
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SRC, sport-related concussion; COP, center of pressure; COM, center of mass; RMS, root mean square; IC, initial contact