

Supplementary Table 1. Intervention characteristics among studies included in review

First author, year [reference]	Study design	Participants (sample size)	Intervention details: Duration, components, training frequency, supervision	Key outcome measures
Sang, 2019 [7]	Prospective quasi-experimental repeated measures design	Youth ages 9-18 years with post-concussion symptoms at least 2 weeks post-injury (n=52)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise (walking or stationary bike) at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10 minutes), and relaxation exercises (5-10 minutes).</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: In-person assessment at 0, 3, and 6. Phone check-ins at week 1, 2 and 4.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Inventory)</li> <li>• Occupational performance and satisfaction (Canadian Occupational Performance Measure)</li> </ul>
Kurowski, 2017 [16]	Randomized clinical trial	Adolescents ages 12-17 years with persistent post-concussion symptoms 4-16 weeks post-injury (n=30)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Progressive aerobic exercise (stationary cycling) at Borg RPE intensity level 11-16.</li> <li>• <u>Training frequency</u>: 5-6 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person assessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Inventory)</li> </ul>
Chrisman, 2019 [17]	Pilot randomized control trial	Adolescents ages 12-17 years with persistent post-concussion symptoms (n=30)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Progressive aerobic exercise training based on results from Buffalo Concussion Treadmill Test.</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: In-person assessment at weeks 0 and 6. Weekly telephone calls weeks 1-5.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Health Behaviour Inventory)</li> </ul>
Chrisman, 2017 [18]	Retrospective cohort study	Youth ages 12-18 with persistent post-concussion symptoms >1 month post-injury (n=83)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: Until symptom resolution.</li> <li>• <u>Components</u>: Progressive aerobic exercise training based on results from Buffalo Concussion Treadmill Test.</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: In-person assessment every 1-2 weeks.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (SCAT-2)</li> </ul>
Leddy, 2019 [19]	Multicentre randomized clinical trial	Adolescent athletes ages 13-18 years presenting within 10	<ul style="list-style-type: none"> <li>• <u>Duration</u>: Until symptom resolution.</li> <li>• <u>Components</u>: Progressive aerobic exercise training based on results from Buffalo Concussion Treadmill Test.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Scale)</li> </ul>

		days of sport-related concussion (n=103).	<ul style="list-style-type: none"> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person assessment</li> </ul>	
Leddy, 2019 [20]	Quasi-experimental Trial	Adolescent athletes ages 13-18 years presenting within 1-9 days of sport-related concussion (n=54).	<ul style="list-style-type: none"> <li>• <u>Duration</u>: Until symptom resolution.</li> <li>• <u>Components</u>: Progressive aerobic exercise training based on results from Buffalo Concussion Treadmill Test.</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Scale)</li> </ul>
Leddy, 2010 [21]	Prospective case series	Youth and adult athletes 16-53 years old experiencing persistent post-concussion symptoms (n=12)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: Until symptom resolution.</li> <li>• <u>Components</u>: Progressive aerobic exercise training based on results from Buffalo Concussion Treadmill Test.</li> <li>• <u>Training frequency</u>: 5-6 days/week.</li> <li>• <u>Supervision</u>: In-person assessment every 3 weeks.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Graded Symptom Checklist)</li> </ul>
Willer, 2019 [24]	Quasi-experimental Trial	Adolescent athletes aged 13-18 years presenting within 10 days of sport-related concussion (n=103)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: Until symptom resolution.</li> <li>• <u>Components</u>: Progressive aerobic exercise training based on results from Buffalo Concussion Treadmill Test.</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Scale)</li> </ul>
Chan, 2018 [25]	Randomized clinical trial	Youth ages 12-18 with persistent post-concussion symptoms >1 month post-injury (n=19)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10 minutes), and relaxation/visualization exercises (5 minutes).</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person reassessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Scale)</li> </ul>
Dobney, 2019 [26]	Randomized clinical trial	Youth ages 9-17 years old with post-concussion symptoms at least 2 weeks post-injury (n=20)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10 minutes), and relaxation/visualization exercises (5-10 minutes).</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Inventory)</li> </ul>

			<ul style="list-style-type: none"> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person reassessment.</li> </ul>	
Dobney, 2017 [27]	Retrospective analysis of prospectively collected clinical data	Youth ages 11-17 years old with post-concussion symptoms at least 3-4 weeks post-injury (n=277)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10 minutes), and relaxation/visualization exercises (5-10 minutes).</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person reassessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Scale)</li> </ul>
Gagnon, 2009 [28]	Case series	Youth ages 10-17 years old with post-concussion symptoms at least 4 weeks post-injury (n=16)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: Until clinical recovery (mean 4.4 weeks, SD = 2.6 weeks)</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10 minutes), and relaxation/visualization exercises (5-10 minutes).</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person reassessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Scale-Revised)</li> </ul>
Gagnon, 2016 [29]	Case series	Adolescents ages 14-18 years old with post-concussion symptoms at least 4 weeks post-injury (n=10)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10 minutes), and relaxation/visualization exercises (5-10 minutes).</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person reassessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Scale)</li> <li>• Mood (Beck Depression Inventory – Second Edition)</li> <li>• Energy level (Pediatric Quality of Life Multidimensional Fatigue Scale)</li> </ul>
Gauvin-Lepage, 2018 [30]	Multicenter prospective quasi-experimental study	Youth ages 8-17 years old with post-concussion symptoms at least 4 weeks post-injury (n=49)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Inventory)</li> <li>• Mood and anxiety (Beck Youth Inventory, Child Behaviour Checklist)</li> </ul>

			<p>minutes), and relaxation/visualization exercises (5-10 minutes).</p> <ul style="list-style-type: none"> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: Weekly in-person reassessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Energy level (Pediatric Quality of Life Multidimensional Fatigue Scale)</li> <li>• Quality of life (Pediatric Quality of Life – Generic Module)</li> </ul>
Imhoff, 2016 [32]	Case Series	Youth ages 10-17 years old with post-concussion symptoms at least 4 weeks post-injury (n=15)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: Until clinical recovery (mean duration: <math>49 \pm 17</math> days).</li> <li>• <u>Components</u>: Progressive low- to high-intensity aerobic exercise (20 minutes) at Borg RPE levels 2-5/10, sport-specific coordination exercises (10 minutes), and therapeutic balance exercises.</li> <li>• <u>Training frequency</u>: 3 days/week.</li> <li>• <u>Supervision</u>: Initial in-person assessment and weekly phone check-in.</li> </ul>	<ul style="list-style-type: none"> <li>• Post-concussion symptoms (Post-Concussion Symptom Inventory)</li> </ul>
Hunt, 2020 [80]	Secondary analysis of prospective quasi-experimental repeated measures design	Youth ages 9-18 years with post-concussion symptoms at least 2 weeks post-injury (n=40)	<ul style="list-style-type: none"> <li>• <u>Duration</u>: 6 weeks.</li> <li>• <u>Components</u>: Comprehensive education, graded low-intensity aerobic exercise (walking or stationary bike) at 50-60% HR<sub>max</sub> or level 4/10 on Pictorial Children's Effort Rating Table (15 minutes), sport-specific coordination drills (10 minutes), and relaxation exercises (5-10 minutes).</li> <li>• <u>Training frequency</u>: 7 days/week.</li> <li>• <u>Supervision</u>: In-person assessment at 0, 3, and 6. Phone check-ins at week 1, 2 and 4.</li> </ul>	<ul style="list-style-type: none"> <li>• Emotional and social well-being (Beck Youth Inventories, Second Edition)</li> <li>• Parental reported psychological well-being (Child Behaviour Checklist)</li> </ul>