

# Interventions for Concussion: An Evaluation of the Evidence

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## Background & Purpose

Between 1.6 and 3.8 million individuals suffer a sports related concussion annually with some individuals reporting symptoms 1 year after their injury. Current Zurich guidelines recommend physical and cognitive rest followed by graded exposure to activity. Aerobic exercise, vestibular physical therapy, and manual physical therapy have also been suggested as alternative intervention options for concussion rehabilitation.

The purpose of this project was to review the current evidence supporting concussion management and assess the quality of the current evidence in order to make a recommendation for the treatment of concussions.

## Methods

- Exhaustive searches performed in PubMed, CINAHL, and EMBASE for our 4 interventions (aerobic exercise, manual therapy, vestibular therapy, and rest)

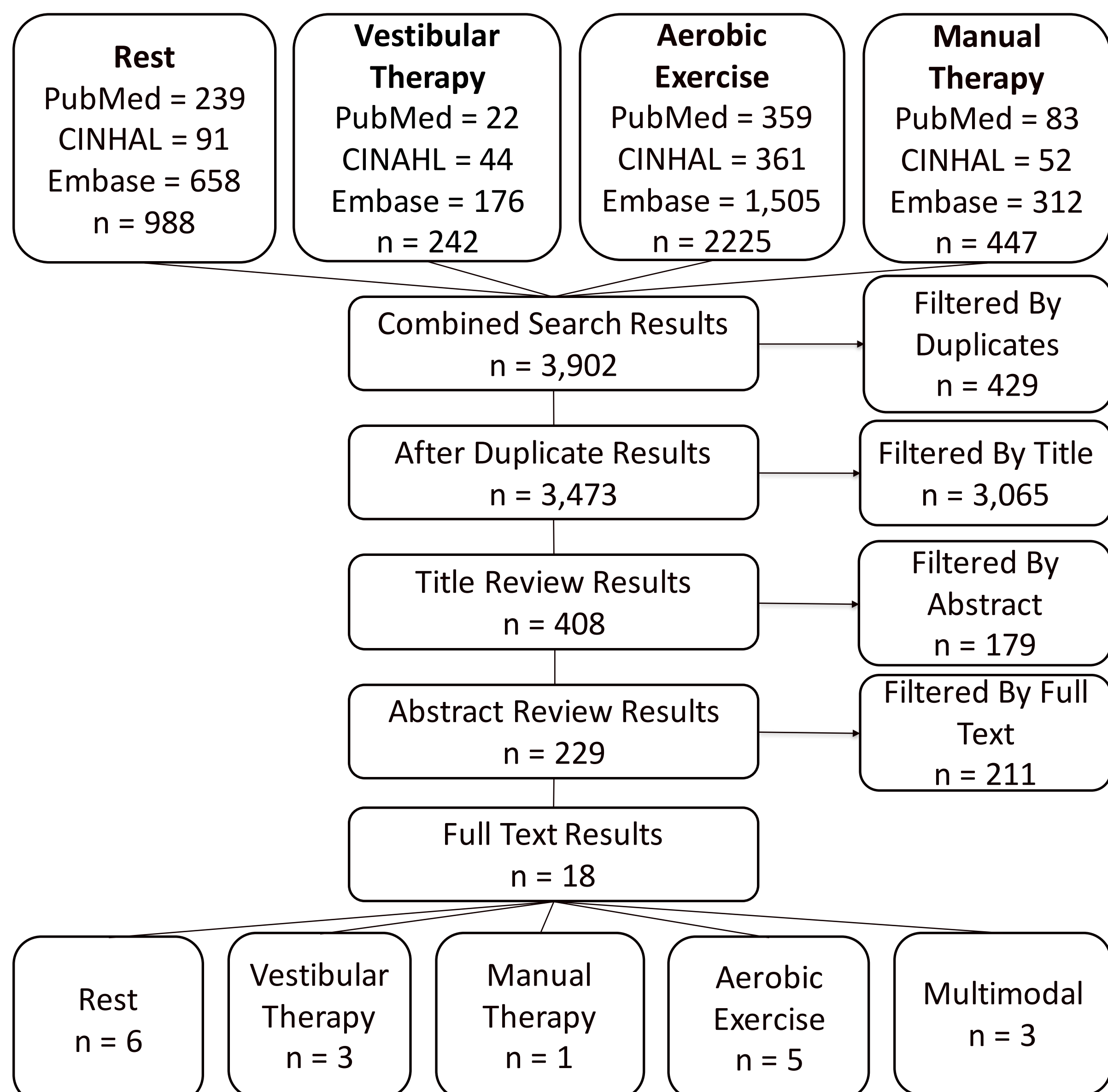
Inclusion criteria:

- Concussion or mild traumatic brain injury (mTBI)
- Included at least one of the selected interventions
- Only human subjects
- Written in English
- Mean age was  $\geq 12$  years of age
- Peer reviewed source

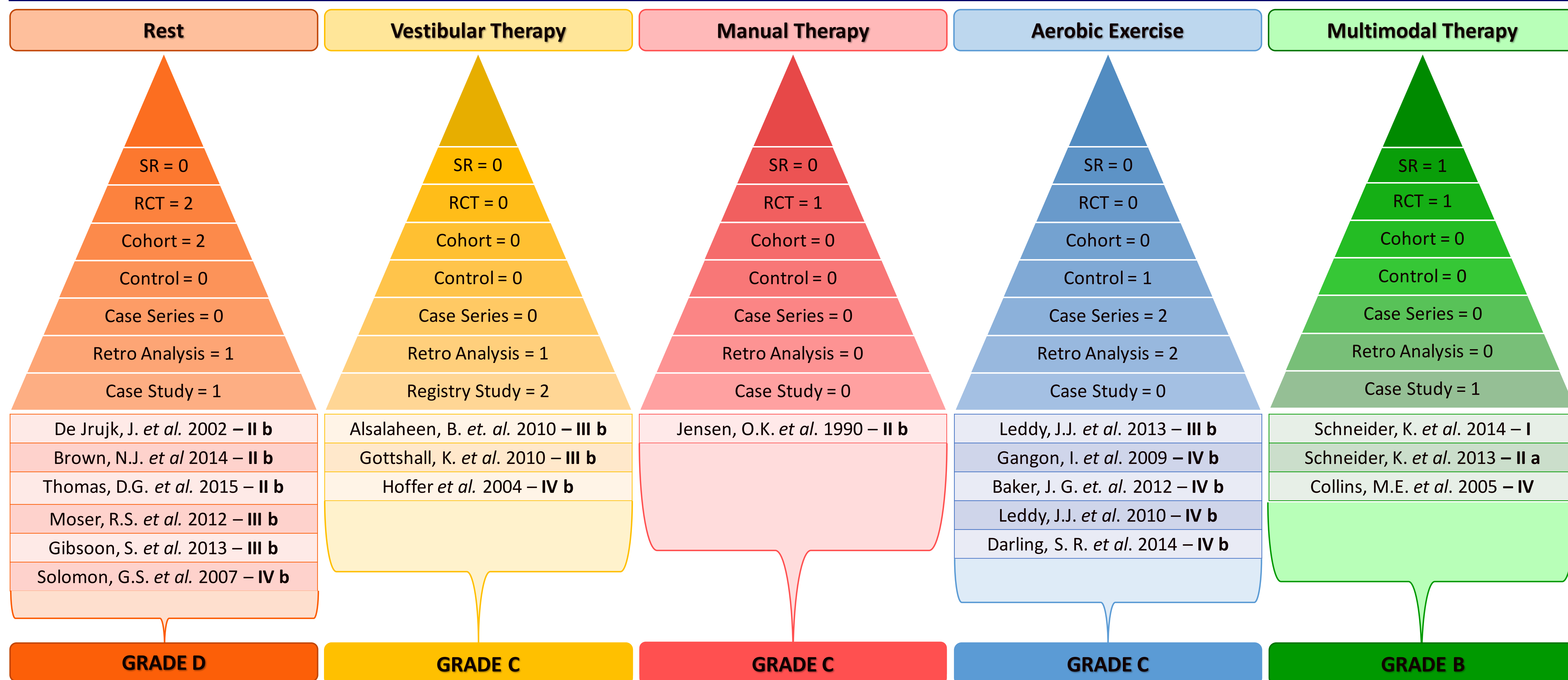
Exclusion criteria:

- Primary purpose of the selected intervention was not for determination of treatment outcome
- Editorial, commentary, or position statements
- Moderate and/or severe traumatic brain injuries

- The literature was evaluated and given a level based on quality.



## Results



Level of Evidence	Study Characteristics
I	Evidence obtained from high-quality randomized controlled trials, prospective studies, or diagnostic studies
II	Evidence obtained from lesser quality randomized control trials, prospective studies, or diagnostic studies (e.g. improper randomization, no blinding, <80% follow up)
III	Case controlled studies or retrospective studies
IV	Case series
V	Expert opinion

Grade Recommendation	Strength of Evidence
A - Strong	A preponderance of level I and/or level II studies support the recommendation. Must include $\geq$ level I study.
B - Moderate	A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendation.
C - Weak	A single level II study or a preponderance of level III and level IV studies including statements of consensus by context experts support the recommendation.
D - Conflicting	The recommendation is based on these conflicting studies.
E - Theoretical	A preponderance of evidence from conceptual models/principles, or from basic sciences/bench research support this conclusion.
F - Expert Opinion	Best practice based on the clinical experience of the guidelines development team.

## Discussion

- Intervention administration varied greatly (6 hours to 12 months post injury).
- Rest had greatest disparity regarding effectiveness and prescription (i.e. cognitive vs. physical).
- A multimodal treatment approach was superior to other approaches.
- Vestibular therapy showed to be effective when specialized to the patient symptoms.
- Manual therapy had very limited evidence.
- Aerobic exercise was shown to be effective, specifically graded exposure to exercise.
- Limitations include heterogeneity among study populations, time since concussion, outcome measures used, and limited good quality research.

## Clinical Relevance & Conclusion

The evidence for concussion interventions is limited and poorly defined. Some general recommendations can be made:

- Too much activity early after injury can be detrimental to recovery.
- Rest is the best option immediately following the concussion.
- More research is needed in order to determine the optimal amount, type, and duration of rest. After a few days, it seems beneficial to then follow a graded exposure back to activity and exercise in order to not exacerbate symptoms.
- A multimodal approach received the highest grade of evidence (GRADE B). Therefore, an individualized, multimodal approach would potentially be beneficial for individuals with persistent symptoms.