

The Chicago-Quick Hand Function Test: An Outcome Measure for In-Hand Manipulation and Dexterity

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Background

The Chicago-Quick Hand Function Test (C-QHFT) is a brief, performance-based assessment designed to measure unilateral hand function, integrating in-hand manipulation, dexterity, and psychomotor sequencing. Before an outcome measure is adopted clinically, it should demonstrate validity, reliability, and normative performance. Existing hand function measures often assess isolated aspects of dexterity and do not fully capture the combined in-hand manipulation and psychomotor integration required for everyday tasks.

Objective

To evaluate content and face validity, inter-rater reliability, intra-rater reliability, test–retest reliability, and age-stratified normative reference values for the C-QHFT.

Methods

Study design:
Four-phase clinical measurement and normative study (Level of Evidence II).

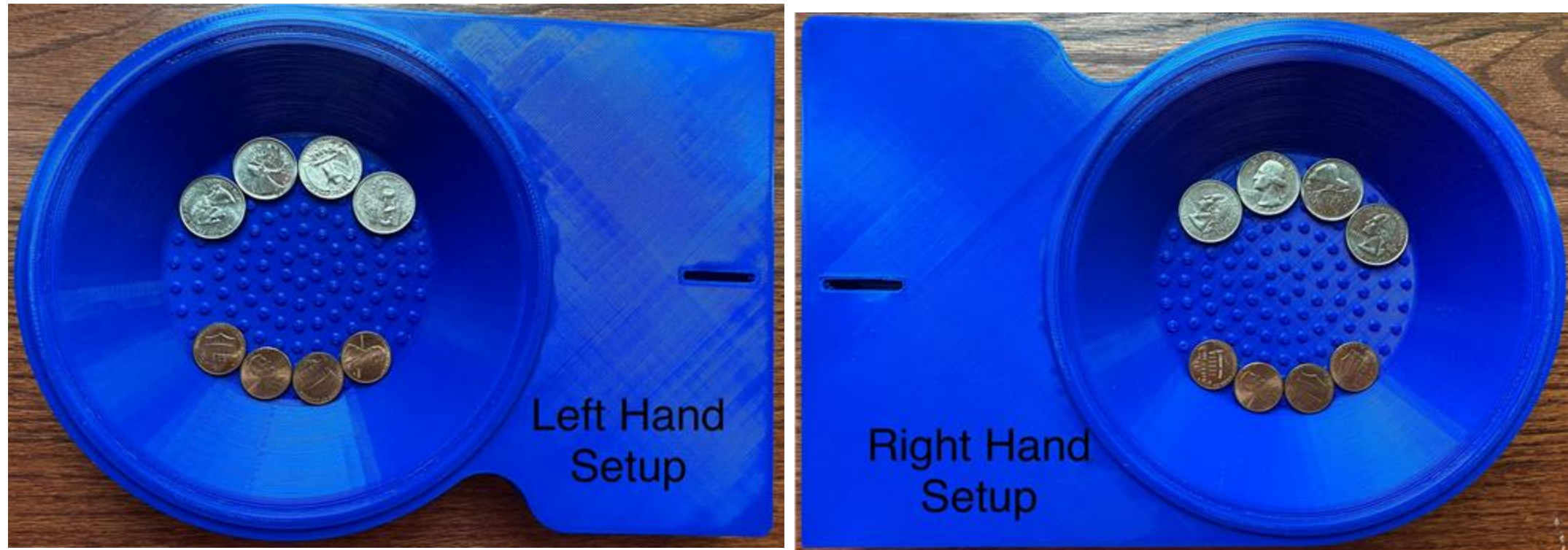
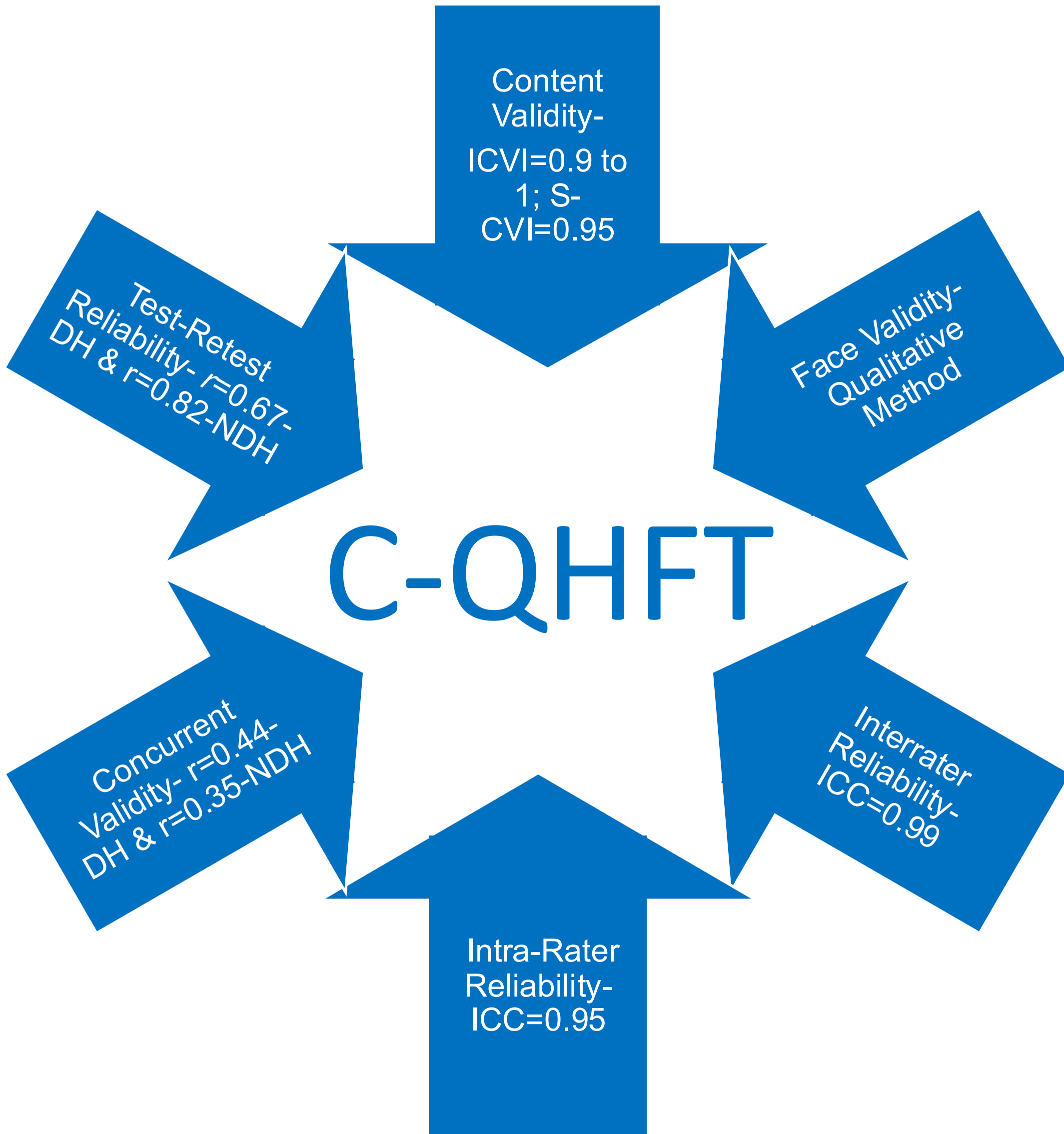
Phase I: Content and face validity
Ten expert clinicians reviewed test items, administration procedures, scoring, and the representation of in-hand manipulation and psychomotor components. A structured content validity index approach was used, with iterative refinement based on feedback.

Phase II: Inter-rater and intra-rater reliability
Inter-rater sample: n = 8
Intra-rater sample: n = 4
Intraclass correlation coefficients were used: ICC (3,1) for inter-rater reliability and ICC (1,1) for intra-rater reliability. Standard error of measurement (SEM) and minimal detectable change at the 95 percent confidence level (MDC95) were calculated. Scoring included time to complete the test, number of cues, and number of coin drops.

Phase III: Concurrent validity and normative data
Concurrent validity sample: n = 209
Normative sample: n = 273 healthy adults, ages 18 years and older, stratified into age groups by decade.
Analyses included Pearson correlations with the Nine-Hole Peg Test, as well as descriptive statistics, ANOVA/MANOVA, and age-stratified reference values.

Phase IV: Test–retest reliability
Sample: n = 32
Time interval: 7 to 14 days
Test–retest reliability was examined using ICC (2,1), Pearson correlations, and Bland–Altman methods to evaluate absolute agreement and limits of agreement.

Results



Age Group	Mean Score	Cutoff-Score
18-29	35.22	50.7
30-39	31.58	42.9
40-49	32.18	44.1
50-59	34.82	46.5
60-69	38.88	57.4
70-79	41.75	59.3
>80	45.2	63.2

Discussion

- Barring the effects of practice and generalization of tasks, DH & NDH have the same functional outcome.
- Statistically, there is no significant difference in C-QHFT scores of DH & NDH.
- The second age group (30-39) had the best score.
- The youngest age group (18-29) had the third-best score.
- Hand function declines with age.

Interpretation For Clinicians

Lower C-QHFT scores indicate better performance. The total score is derived from time to complete the task, the number of cues provided, and the number of coin drops. Small differences between raters (less than about 2 seconds) are likely due to measurement error. Over time, changes smaller than approximately 8 to 9 seconds may reflect normal variability rather than true change in hand function, based on MDC95 values from the test–retest data in healthy adults. Age-stratified normative values and cutoff scores provide useful reference points for interpreting whether an individual’s performance falls within expected ranges for their age group.

Conclusion

The C-QHFT demonstrates strong content and face validity, excellent inter-rater and intra-rater reliability, and moderate to high test–retest stability. Age-stratified normative reference values further enhance its interpretive utility. Overall, the C-QHFT is a concise, reliable assessment of unilateral hand function in adults and is suitable for use in both clinical practice and research.

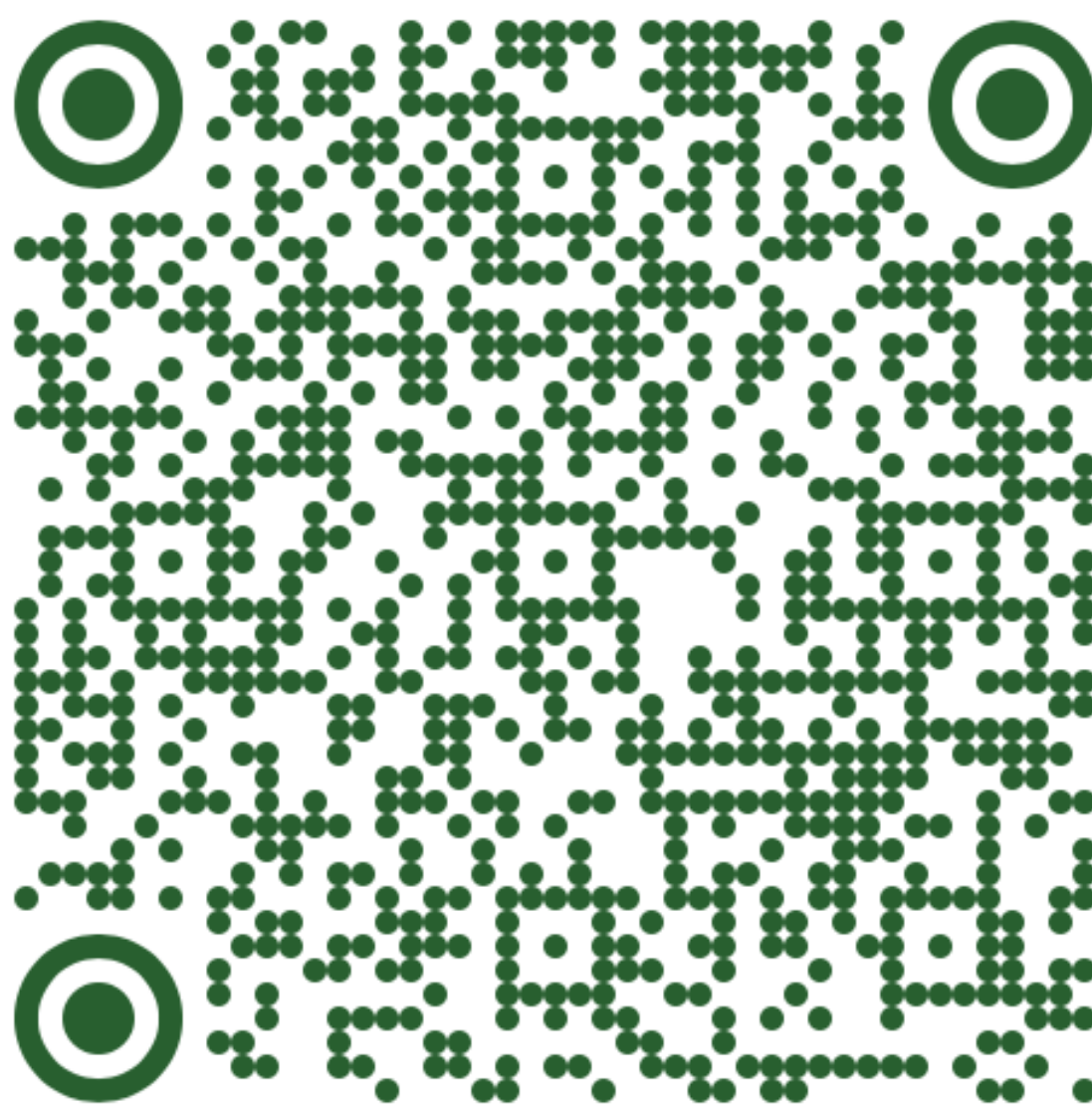
Limitations

- The intra-rater reliability sample was small.
- Pediatric populations were not included.

Future Directions

Future research should establish MCID and responsiveness in clinical populations, examine sensitivity and specificity and receiver operating characteristic (ROC) curves, and evaluate the C-QHFT across diagnostic groups and clinical settings. Additional work is also needed to validate the test in pediatric populations, explore cross-cultural applications, and examine options for digital administration and scoring.

References



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