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The Matching Assessment using Photographs with Scars (MAPS) App: Reliability testing

Tanja Klotz[1], **Rochelle Kurmis**[2]

1. Senior Occupational Therapist, Burns, Royal Adelaide Hospital, Port Rd, Adelaide, Australia 5000. Tanja.Klotz@sa.gov.au
2. Allied Health Project manager, Adult Burn Centre, Royal Adelaide Hospital, Port Rd, Adelaide, Australia 5000

Background:

The MAPS scar assessment tool, published in 2005, was recommended as one of the preferred scar assessment tools by a recent systematic review, as it enables accurate relocation and reassessment of the scar. With electronic records & increasing use of smart devices in health, the MAPS manual was translated into an App format.
At the time of development no other scar assessment Apps were available, making this the first of its kind.
To ensure the MAPS App version maintained the inter- & intra-rater reliability of the original MAPS manual, testing was conducted (see Fig 1.).

Inter-rater reliability – comparison of Rater 1 vs 2 vs 3

Variable	Combined Fleiss' Kappa	Interpretation	ICC (95% CI)	Interpretation
Surface	0.40*	Fair agreement	0.76 (0.61, 0.86)	Excellent reliability
Height	0.38*	Fair agreement	0.87 (0.78, 0.92)	Excellent reliability
Thickness	0.49*	Moderate agreement	0.89 (0.82, 0.94)	Excellent reliability
Colour	0.40*	Fair agreement	0.91 (0.86, 0.95)	Excellent reliability

Intra-rater reliability – comparison of Initial vs. repeat assessments

Variable	Cohen's Kappa	Interpretation	ICC (95% CI)	Interpretation
Surface	0.56*	Moderate agreement	0.76 (0.55, 0.87)	Excellent reliability
Height	0.43*	Moderate agreement	0.76 (0.55, 0.87)	Excellent reliability
Thickness	0.57*	Moderate agreement	0.82 (0.67, 0.91)	Excellent reliability
Colour	0.90*	Almost Perfect agreement	0.98 (0.97, 0.99)	Excellent reliability

* p < 0.0001

Figure: Reliability testing process and results tables.

Health Statistician:
Pre-determined power calculation (n=42 scars, 3 assessors)

Rating Process:
- Initial rating of pre-selected scars conducted using MAPS App module on portable digital tablet device
- Re-assessment of same scar sites 3-7 days following initial assessment

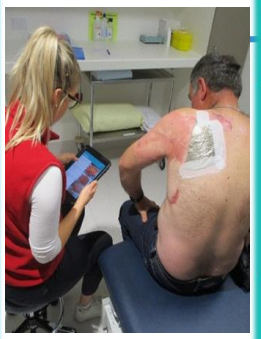
Primary Investigator:
- Identified 3-10 scars on each volunteer participant
- Provided brief education and familiarization on the App to raters
- Recorded each assessment location via photo to allow for accurate relocation at re-test
- Observed and recorded de-identified assessment scores for each rater
- Raters blinded to each other's assessment & scores

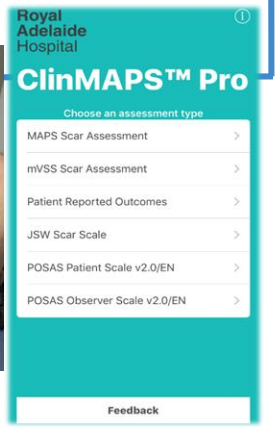
Rater 1: Experienced at scar assessment, Physiotherapist

Rater 2: Novice at scar assessment, Occupational Therapist

Rater 3: Novice at scar assessment, Occupational Therapist

Health Statistician:
Analysis of assessment data:
- Inter-rater reliability; Fleiss' Kappa calculated
- Intra-rater reliability; Cohen's Kappa calculated





Intra-rater reliability – Cohens's Kappa comparison of initial vs repeat assessments for Rater 1 (experienced rater)

Surface	0.81*	Almost perfect agreement
Height	0.62*	Substantial agreement
Thickness	0.74*	Substantial agreement
Colour	0.70*	Substantial agreement

Results:

Eight **participants** (7 male:1 female), aged 47-80 years, representing a total of 44 scars, were included for the purpose of determining reliability of scar ratings using the MAPS module within the App.
Inter-rater reliability, Fleiss Kappa comparison of Rater 1 vs 2 vs 3 demonstrated Fair to Moderate Agreement across the 4 domains of Surface (P=≤0.002), Height (P=≤0.0001), Thickness (P=<0.0001), & Colour (P=<0.0001). ICC results demonstrated excellent reliabi;ity across all domains.
Combined Cohen's Kappa **intra-rater reliability** comparisons of all raters of initial vs repeat assessments demonstrated Moderate to Almost Perfect Agreement across the 4 measured domains (P=<0.0001). Intra-rater reliability for Rater 1 demonstrated Substantial to Almost Perfect Agreement across all 4 measured domains (P=<0.0001). ICC results demonstrated excellent reliabi;ity across all domains.

Discussion:

The MAPS App contains scar assessment tools that can reliably be applied to clinical practice and research.
It's report output can be easily integrated into electronic records or printed for paper records due to its functionality. As it can be completed on a mobile device it is easily accessible for clinicians and researchers, and takes less time to complete than the original paper version
Clinicians who have experience examining scars have demonstrated excellent intra-rater reliability.

Conclusions:

The MAPS module of the App has demonstrated intra- and inter-rater reliability as a scar assessment tool given its change in format from a paper based manual to digital App with upgraded reference photographs.

Reference:

Masters M, et al. Reliability testing of a new scar assessment tool, Matching Assessment of Scars and Photographs (MAPS). JBCR. 2005;26(3):273-84.

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