Proof of concept for tension reducing taping as a mechanotherapy for hypertrophic post trauma and burn scars.

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Background and aims

There is strong acknowledgement that mechanical forces can regulate inflammation and fibrosis and therefore may be used therapeutically to stimulate tissue repair and remodeling. This mechanism is referred to as “mechanotherapy”. Although the pathophysiological background of mechanotherapy is well described, evidence based practical applications are lacking within scar treatment.

The goal of this study is to obtain a proof of concept for a newly developed taping technique that can reduce tension on pathological post trauma and burn scars.

Method

Scar patients are selected based upon predefined in- and exclusion criteria. Two pieces of tape are applied in a standardised way, thus reducing tension at the scar site. The tape makes no direct contact with the scar site, thereby avoiding maceration of the scar.

Baseline measurement + retests are performed by a cutometer on 6 cm² scar/skin
Cutometer: the skin is pulled up for 3 seconds by a vacuum device using a negative pressure of 350 mbar

Scar before and after tape application

Statistics for evaluating changes in scar/skin distensibility :

1. Mann-Whitney U-test: difference between scar and healthy side before tape.
2. Wilcoxon signed ranks test: difference before and after tape.
3. Friedman test: tension reducing effect of tape over 3 days without reapplying the tape.

Results

Five scarred areas were tested. The mean scar age was 7,2 months (7,2 months $\pm$ 0,84 months) of which four scars were treated with a split thickness graft and one scar healed spontaneously. All scars were located in between joints.

Table 1: Results before application and corresponding healthy side

Cutometer	M1	H1	p-value
MPA580			
Extensibility	0,324 $\pm$ 0,061	1,086 $\pm$ 0,099	p=0,025

(M1= Measurement1; H1=Healthy side1)

Table 2: Results before and after application of tape

Cutometer	M1	M2	p-value
MPA580			
Extensibility	0,408 $\pm$ 0,212	0,761 $\pm$ 0,547	p=0,043
	M1	M3	p-value
	0,408 $\pm$ 0,212	0,581 $\pm$ 0,521	p=0,225
	M1	M4	p-value
	0,408 $\pm$ 0,212	0,457 $\pm$ 0,372	p=0,686
	M1	M5	p-value
	0,408 $\pm$ 0,212	0,298 $\pm$ 0,076	p=0,273

(M1= Measurement1; M2= Measurement2; M3=Measurement3; M4=Measurement4; M5=Measurement5)

Table 3: Results after application of tape as well as one, two and three days later

Cutometer	M1	M2	M3	M4	M5	p-value
MPA580						
Extensibility	0,408 $\pm$ 0,212	0,761 $\pm$ 0,547	0,581 $\pm$ 0,521	0,457 $\pm$ 0,372	0,298 $\pm$ 0,076	p=0,165

(M1= Measurement1; M2= Measurement2; M3=Measurement3; M4=Measurement4; M5=Measurement5)

Discussion

Although, according to the Friedman test, there is no significant change of distensibility over time, it looks like the significant increase in distensibility obtained after tape application is already lost after 24 hours. The main reason for this loss of effect appears to be the loosening of the tape. This loss of adhesion is probably inherent to the method of taping. This technique uses two separate strokes of tape, which increases the chance of loosening. When using only one stroke of tape to surround the scarred area, as described in the study of Moortgat et al. 2015, this risk reduces . The findings of the present study must be interpreted as a pilot study.

Conclusion

The use of elastic tape around a scar influences scar distensibility which results in a change of mechanical forces onto the scar = mechanotherapy. The two piece tape technique requires some adjustments to enhance adhesion of the tape.