

# How are the surfaces and shape important to prevent pressure ulcers?

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## Introduction



The contact surfaces shape and the material type they are made of, are very crucial issues to figure out better the consequences on the skin integrity of the users sitting on a wheelchair. More, we have to consider how the contact surfaces can grant breathability and moisture absence, in order to avoid the increase of skin temperature and local humidity.



In this evaluation, we pointed out that a particular backrest shape (not flat but a V shape) and an innovative material used for the backrest as well as for the seat, can decrease significantly the interface pressure on the user's skin, even without using a specific antidecubitus cushion (for those patients who don't have such a high level of risk, according to Braden and Waterlow Scale).



## Subjects, material and methods

We evaluated two patients: one (female) with severe outcome of Sub Aracnoid Haemorrhage by Brain Aneurism followed by a non response period, with significant pressure ulcer risk (weight 45 kg), and another one (male) with an outcome of a Stroke Ischemic and Haemorrhagic followed by a non response period (weight 78 kg).

They used a tilt-in-space wheelchair with a specific backrest shape and with a particular surfaces, totally breathable and with a similar visco-elastic effect.

We tried to put them in different positions according to the items of the observation:

> Subject 1, female, 59 y.o., outcome of Sub Aracnoid Haemorrhage by Brain Aneurism followed by a non response period (occurring on January 2016), weight 45 kg.

> Subject 2, male, 69 y.o., outcome of Stroke Ischemic-Haemorrhagic followed by a non response period (occurring on July 2016), weight 78 kg. Braden score was 13 pts for both Clients.

Assessments done for both subjects:

### > With upholstery

- No tilt in space
- 20° of tilting
- Max tilting
- Max tilting and backrest reclination (36°)
- Max tilting and backrest reclination (36°), rised legrests (-10°)

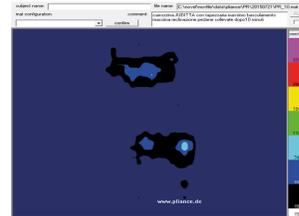
### > Without upholstery

- No tilt in space
- 20° of tilting
- Max tilting
- Max tilting and backrest reclination (36°)
- Max tilting and backrest reclination (36°), rised legrests (-10°)

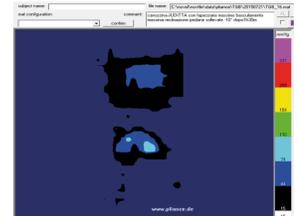
The acquisition with Pressure Mapping Sensor were done immediately after positioning, after 10 minutes and after 1 hour and half of sitting.

## Results

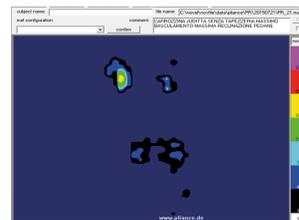
The data obtained show a good distribution of the pressures, bearing in mind that there isn't any interface cushion between the seat and the user's bottom.



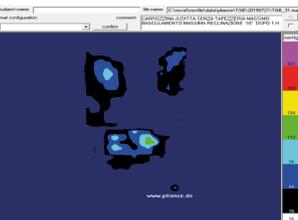
Picture 6 - Subject #1 with upholstery, max tilting, max backrest reclination and raised legrests, after 10 minutes



Picture 16 - Subject #2 with upholstery, max tilting, max backrest reclination and raised legrests after 10 minutes



Picture 10 - Subject #1 without upholstery, max tilting, max backrest reclination and raised legrests after 15 minutes



Picture 21 - Subject #2 without upholstery, max tilting, max backrest reclination and raised legrests after 1 hour

The upholstery works like a “filter” making more uniform the pressure distribution, spreading the contact surface for the user.

For the patients, beside, it's possible to see a non significant pressure increase under the ischial bones.

The upholstery effect on the backrest grants more uniformity of the pressure concerning, on the frontal plane, the whole back; the records without upholstery show that the back in the middle is completely unloaded and the contact is possible just laterally with a minimal pressure increase consistent with the contact surfaces reduction (see pics comparison of the acquisition with and without upholstery).

The subject 1 (with a light weight) shows an optimal distribution of pressure throughout all recorded positions.

Looking at these evaluations, the reaction of the particular surface material, of the seat and of the backrest, totally breathable and with a visco-elastic similar effect, is very effective in both situation (with upholstery and without upholstery); in particular, the configuration without upholstery allows a better descent of the bottom for the patient and an effective pressure spread under the bottom.

## References

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