

BODY INTERFACE PRESSURE POINT TESTING
AND
SUBJECTIVE COMFORT TESTING

A Comparison of the Motion Concepts Matrix Cushion Against Four Market
Standard Cushions

Prepared For:

Motion Concepts
84 Citation Dr.
Concord, ON L4K 3C1

Prepared By:

Sheila Buck B.Sc.(OT) Reg.(Ont.), ATP
Therapy NOW! Inc.
Milton, ON

October 17, 2002

BODY INTERFACE PRESSURE POINT AND SUBJECTIVE COMFORT TEST

INTRODUCTION: This report documents the results of interface pressure point testing and a subjective comfort study conducted on a comparison of 5 wheelchair cushions. The testing was completed on October 7, 2002. Test measurements were conducted using a FSA pressure management system (Vista Med, Winnipeg, Canada). The test protocol was followed for testing of 10 ambulatory subjects.

Each subject was measured with the FSA for pressure distribution on 4 cushions. The cushion identification was screened from the subject vision. Each client sat for a total of two minutes on each cushion to allow for accommodation of the properties to client size and pressure. Each subject was asked to rate the cushions on a scale of 1 – 10 for comfort.

TEST PROCEDURE: All pressure measurements were conducted using the same pressure measuring equipment (FSA). The same calibration was used in each test and the testing was completed by the same investigator. Each subject was asked the same questions for rating comfort after the two minutes passed, to allow the subject to acclimate to the cushion. All subjects were cognitively intact.

Measurements were determined to provide pressure readings (mmHg) of:

1. right and left ischial tuberosities – an average of 9 cell data in the IT area
2. maximum peak pressures
3. average pressures

The subjects were three male and seven female genders. Five test subjects utilized 16" x 18" cushions and five subjects utilized 18" x 18" cushions.

CUSHIONS TESTED:

The four cushions tested were obtained through Medical Equipment Suppliers, and directly from the manufacturer distribution center. The cushions were set up and adjusted as per the manufacturers' instructions by the investigator. All cushions were placed on a rigid base on a chair with a rigid contoured back. The FSA pad was positioned in the same orientation for all subjects. Each subject was requested to sit with their hands their lap in a relaxed pose. Foot rest height was adjusted by the investigator for each subject to maximize thigh support and pelvic positioning to an approximate 90 degree hip angle.

The cushions tested were:

- Motion Concepts Matrix
- Invacare Ultimate
- J2
- Infinity with Visco insert

TEST RESULTS:

Matrix:

This is a contoured visco foam cushion designed for comfort and pressure reduction. The foam is layered with varying densities to form shape to maximize trochanter support, ischial relief and thigh support, with low memory foam on the top to add softness and pressure management.

The following chart shows the pressure distribution and subject evaluation of comfort of the cushion.

Subject	1	2	3	4	5	6	7	8	9	10
Right ischial	15.5	15.67	16.67	24.22	16.11	14.39	8.98	10.02	9.31	21.55
Left Ischial	21.22	18	16.11	27.78	15.89	13.83	9.94	10.92	8.97	15.88
Max. peak pressure	34	24	29	36	22	27	15	19	12	29
Avg. Pressure	6.91	7.77	7.98	12	6.8	5.63	5.01	4.53	4.68	8.17

Subject	1	2	3	4	5	6	7	8	9	10
Comfort	8	8	5.5	7.5	5	8	5	8	8	6

Subjective evaluation by Subjects: Scale 1 – 10 1= poor 10= excellent

The test data shows that this cushion tested the best comparatively for the lowest scores in peak pressures. It was second overall for average pressures and left and right average ischial pressures. It was rated first for comfort.

Invacare Ultimate:

This is a contoured foam cushion with layers of varying density foam which form the shape of the cushion. There is a layer of visco foam on top for pressure management and comfort. The cushion was designed for the management or distribution of pressures for individuals who are at risk of pressure sore development.

The following chart shows the pressure distribution and subject evaluation of comfort of the cushion.

Subject	1	2	3	4	5	6	7	8	9	10
Right Ischial	12.98	16.56	22.33	24.11	13.78	14.51	8.64	13.44	13.22	19.67
Left Ischial	14.8	19.56	16.89	27.33	14.44	15.63	13.89	12.92	11.26	24
Max. peak pressure	24	33	38	35	18	25	22	18	18	41
Avg. Pressure	6.18	7.94	8.41	11.4	6.8	6.05	5.16	6.08	5.97	9.23

Subject	1	2	3	4	5	6	7	8	9	10
Comfort	6	7	8	7.5	4	8	6	7	9	6

Subjective evaluation by Subjects: Scale 1 – 10 1= poor 10= excellent

The test data shows that this cushion tested third comparatively for the lowest scores in peak pressures. It rated fourth for lowest average pressures and left and right ischial pressures (averaged). It was rated second highest for comfort.

J2

The J2 cushion is a cushion that has been used for the management of pressure distribution for individuals who are at risk for skin breakdown. The cushion is a molded foam base to provide stability with a fluid filled pad overlay which allows for pressure distribution.

The following chart shows the pressure distribution and subject evaluation of comfort of the cushion.

Subject	1	2	3	4	5	6	7	8	9	10
Right ischial	11	11.01	17.28	25	10.02	10.71	9.5	14.33	11.4	19.22
Left Ischial	16.44	17.33	14.82	28	17.56	12.2	14.11	12.71	11.9	20.33
Max. peak pressure	25	26	31	42	25	21	23	26	16	31
Avg. Pressure	6.4	7.56	7.43	12.5	6.08	4.88	5.46	6.2	6.39	9.08

Subject	1	2	3	4	5	6	7	8	9	10
Comfort	8	7	6	3.5	6	8	5	6	7	5

Subjective evaluation by Subjects: Scale 1 – 10 1= poor 10= excellent

The test data shows that this cushion tested second overall comparatively for the lowest scores in peak pressures. It rated third overall for average pressures and first overall for left and right ischial pressures (averaged). It was rated lowest overall for comfort.

Infinity Visco

This cushion is a molded foam base with layers of foam of varying densities developed to distribute pressure over the trochanters and away from the IT's. A rear central pad of pressure relieving visco foam allows the IT's to sink down into the foam. The cushion was designed for the management or distribution of pressures for individuals who are at risk of pressure sore development.

The following chart shows the pressure distribution and subject evaluation of comfort of the cushion.

Subject	1	2	3	4	5	6	7	8	9	10
Right ischial	17.88	12.47	10.92	27.44	9.04	21	10.14	14.84	14.33	12.12
Left Ischial	24.56	18.11	15.11	28.67	13.67	22.21	14.16	10.46	15.93	15.01
Max. peak pressure	42	31	20	43	20	47	23	22	24	24
Avg. Pressure	7.09	6.92	6.81	11.7	5.74	6.91	5.15	4.98	5.85	6.24

Subject	1	2	3	4	5	6	7	8	9	10
Comfort	8	7.5	5	6	7	8	7	5	7.5	3

Subjective evaluation by Subjects: Scale 1 – 10 1= poor 10= excellent

The test data shows that this cushion tested fourth overall comparatively for the lowest scores in peak pressures. It did however, rate first overall for average pressures and third for left and right ischial pressures (averaged). It was rated third for comfort.

SUMMARY

The following charts indicate a summary of the pressure and comfort readings for all five cushions tested. It is important to note that these cushions were tested on fully ambulatory subjects with full ability to weight shift and of fairly symmetrical postures.

Area	Matrx	Ultimate	J2	Infinity Visco
Right Ischial	15.24	15.92	13.95	15.02
Left Ischial	15.85	17.07	16.54	17.79
Max. Peak	24.7	27.2	26.6	29.8
Avg. Pressure	6.95	7.32	7.2	6.74
Comfort	6.9	6.85	6.15	6.4

From these findings, it can be concluded that the Matrx cushion does provide good pressure management with good pressure distribution. Peak pressures were found to be the lowest on the Matrx as compared to the other cushions and it had the second lowest overall average pressure and average ischial (right and left averaged) pressures. It is rated as a very comfortable cushion, although this was rated over a short time frame only.

Overall, this would indicate that the Matrx Cushion is a good choice cushion for those clients requiring pressure management and pressure distribution with good postural control and comfort. It is a maintenance free cushion and can therefore be used in a full variety of settings.