

# The Functional Mobility Scale (FMS): Responsiveness to change

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## Background

The Functional Mobility Scale (FMS) was developed in the Hugh Williamson Gait Laboratory in Melbourne, Australia. It is a performance measure that classifies functional mobility for children with cerebral palsy according to the need for assistive devices over 3 specific distances (5, 50 and 500 metres). These distances correspond to the different environmental settings of home, school and the wider community. Based on child/parent report a rating of 1 to 6 is assigned for each distance.

For example, a child who is able to walk independently around the home on level surfaces only, but requires the use of crutches at school and uses a wheelchair for longer community distances is rated as 5, 3, 1.

## Objective

The objective of this study was to examine the responsiveness to change of the FMS in children with spastic diplegia following single event multilevel surgery (SEMLS).

## Method

The study was a descriptive retrospective review. The participants were a consecutive sample of 66 children (32 females and 34 males) with spastic diplegia, GMFCS levels I to III, undergoing SEMLS at a tertiary hospital setting. The children were aged between 4 and 16 years (mean 10.1 years) at the time of surgery.

The gait laboratory records and two dimensional video recordings of the children were reviewed by the same experienced investigator. They were rated using the FMS and classified according to GMFCS level pre-operatively and then at 3, 6, 9, 12 and wherever possible 24 months post-operatively.

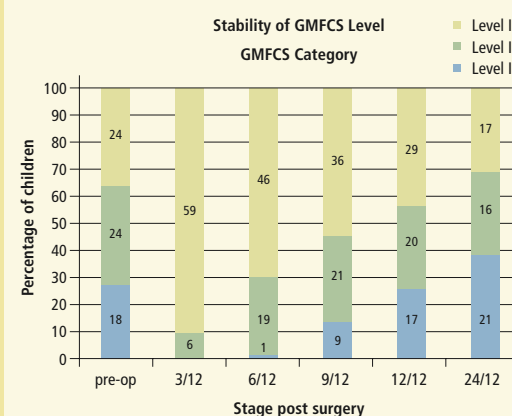
Odds ratios with 95% confidence intervals were used to determine change from pre-operative level at each post-operative time interval.

## Results

Pre-operatively the children were GMFCS levels I (28%), II (36%) or III (36%). All children had data collected to 12 months post-operatively and 54 children had data collected to 24 months post-operatively.

### GMFCS levels

GMFCS level remained stable throughout the post-operative period for children classified pre-operatively as level III but not for children classified as I or II.



### FMS ratings

Odds ratios were calculated for each distance (5, 50 and 500 metres) over each post-operative time period (see table). Odds ratio of greater than 1 indicates a lower FMS and odds ratio of less than 1 indicates higher FMS. For all children for

all distances there was a significant deterioration in mobility at 3 and 6 months post-operatively. Trends thereafter showed improvement in mobility with return to baseline by 12 months and significant improvement at 24 months post-operatively.

Time Post-op	5 metres Odds ratio	P value	50 metres Odds ratio	P value	500 metres Odds ratio	P value
3 months	7.7	<0.001*	11.5	<0.001*	4.1	<0.001*
6 months	2.8	<0.001*	3.1	<0.001*	2.0	0.004*
9 months	1.5	0.08	1.3	0.24	1.1	0.628
12 months	0.9	0.55	0.8	0.33	0.7	0.071
24 months	0.5	0.002*	0.5	0.001*	0.4	<0.001*

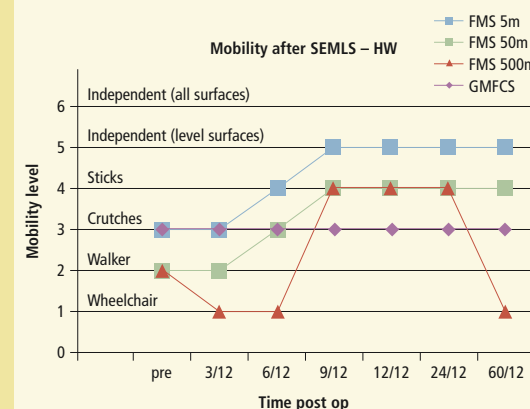
\*denotes statistically significant result

## Discussion

The GMFCS is a classification system and has been shown to be stable over time. This study has shown that following SEMLS the GMFCS level can change, particularly for children classified as GMFCS level I and II.

For the FMS, the overall general trend with the odds ratios was significant deterioration at 3 and 6 months post-operatively followed by improvement, reaching significance at 24 months. This is consistent with clinical observation of change following SEMLS. The odds ratios for the 500m distance followed a similar pattern to the 5 and 50 metres but the values were lower suggesting that at these distances most children function at a lower level pre-operatively and change is not as striking.

Case example of how the FMS can track change in a child with spastic diplegia following SEMLS.



## Conclusion

The FMS was found to be useful for demonstrating change after surgery for children with spastic diplegia, particularly for children classified as GMFCS level III as it incorporates different levels of assistance required over three specific distances representing different functional situations.

### Contact Details

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### References

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Rating **6**

**Independent on all surfaces:**  
Does not use any walking aids or need any help from another person when walking over all surfaces including uneven ground, curbs etc. and in a crowded environment.

Rating **3**

**Uses crutches:**  
Without help from another person.

Rating **5**

**Independent on level surfaces:**  
Does not use walking aids or need help from another person.\* Requires a rail for stairs.  
\*If uses furniture, walls, fences, shop fronts for support, please use 4 as the appropriate description.

Rating **2**

**Uses a walker or frame:**  
Without help from another person.

Rating **4**

**Uses sticks (one or two):**  
Without help from another person.

Rating **1**

**Uses wheelchair:**  
May stand for transfers, may do some stepping supported by another person or using a walker/frame.

Walking distance	Rating: select the number (from 1-6) which best describes current function
5 metres (yards)	
50 metres (yards)	
500 metres (yards)	

Rating **C** **Crawling:**  
Child crawls for mobility at home (5m).

Rating **N** **N = does not apply:**  
For example child does not complete the distance (500m).