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Objective measurement of facial neuromuscular retraining therapy combined with botulin toxin injection for facial paralysis

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Abstract

Objective: We hypothesized that neuromuscular retraining therapy combined with botulinum toxin injections (NMRT-B) could enhance the effectiveness of treatment for facial problems caused by facial paralysis. Also, we developed a new method to evaluate facial functions in a detailed, accurate, and objective manner. Methods: It has been recommended that patients with one-sided facial paralysis that does not resolve for more than 6 months undergo scheduled treatment with NMRT-B. The patients were scheduled to begin NMRT after 1–2 weeks of botulinum toxin A injection on the affected side and/or on the unaffected side. The second botulinum toxin A injection was conducted at 6 months after the first injection, and NMRT was continued for more than 6 months. And we used a computer-based numeric scoring system alone to confirm facial functions. Results: Most patients with chronic facial paralysis who underwent NMRT-B treatment exhibited better results after 1 year. NMRT-B provided satisfactory control of synkinesis as well as primary movement. Using our method for evaluation of facial asymmetry, the average primary facial function movement score was calculated as 57.3 (0.573), average secondary facial function movement score was 14.2 (0.142), and average final facial function movement score was 43.1 (0.431) before treatment Conclusions: We demonstrated that NMRT-B was effective for patients with synkinesis and facial asymmetry and that the results differed depending on the degree of facial paralysis. We also established a method to evaluate facial paralysis in an objective manner that excludes subjective judgment.

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figures/fig2-A,B,C/fig2-A,B,C-eps-converted-to.pdf

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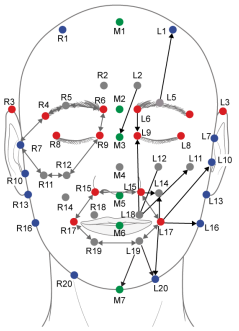
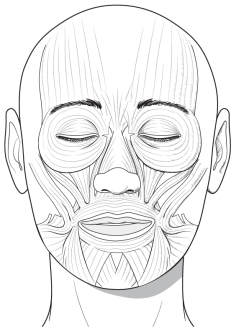
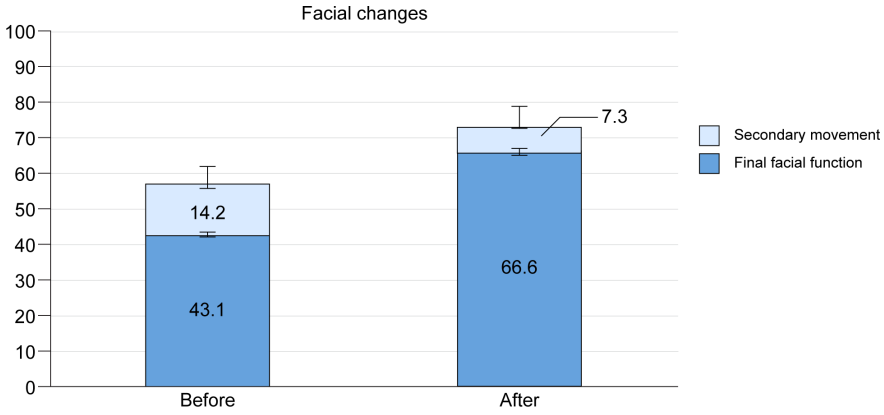
Analysis of facial asymmetry





MUSCLE	LOCATION (origin-insertion)	
Frontalis	R1-R5	L1-L5
Corrugator	M3-R2	M3-L2
Depressor supereilii	R9-R6	L9-L6
Orbicularis oculi	(R4-R7)+(R4-R5)+(R5-R6)+(R6-R9)+(R9-R12)+(R11-R12)+(R7-R11)	(L7-L4)+(L4-L5)+(L5-L6)+(L6-L9)+(L9-L12)+(L12-L11)+(L11-L7)
Levator labii superioris	R9-R18	L9-L18
Nasals	R14-R15	L14-L15
Zygomaticus minor	R11-R18	L11-L18
Zygomaticus major	R10-R17	L10-L17
Risorius	R16-R17	L16-L17
Levator anguli oris	R14-R17	L14-L17
Orbicularis oris	(M5-R15)+(R15-R17)+(R17-R19)+(R19-M6)	(M5-L15)+(L15-L17)+(L17-L19)+(L19-M6)
Depressor anguli oris	R20-R17	L20-L17
Depressor labii inferioris	R20-R19	L20-L19
Mentalis	M7-R19	M7-L19
Exceptions	Temporalis, Procerus, Depressor septi nasi, Dilator naris anterior, Masseter, Buccinator, platysma	



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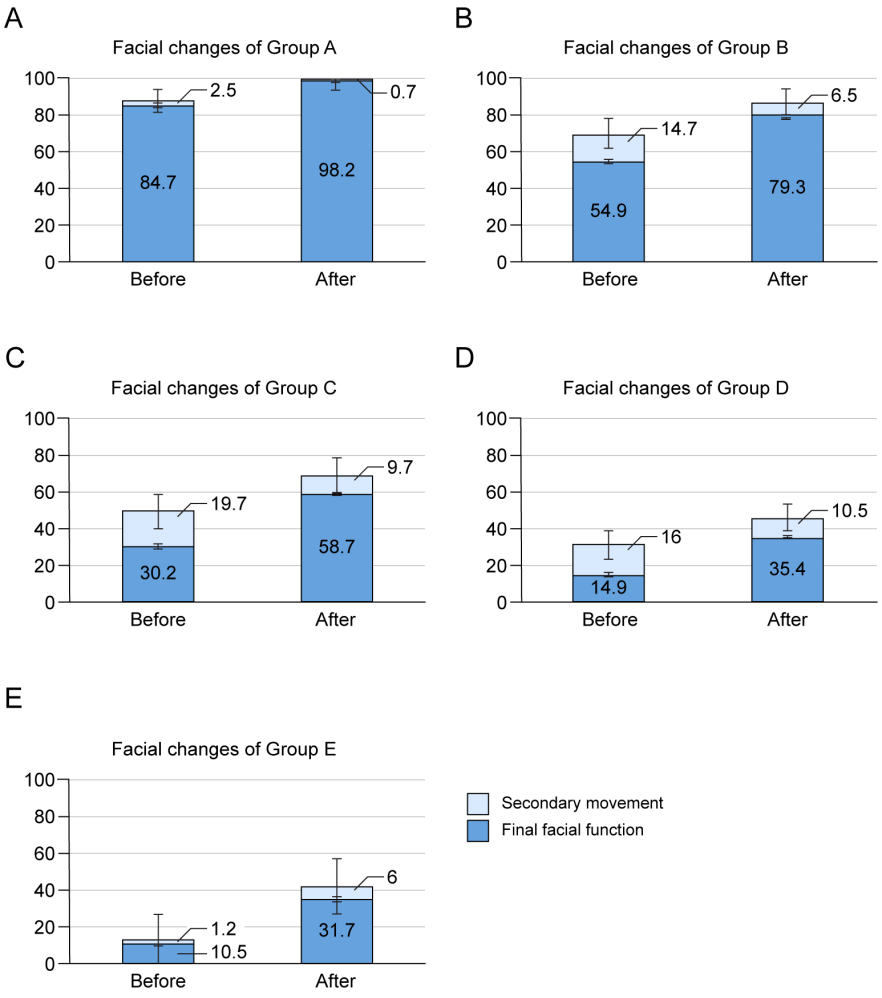

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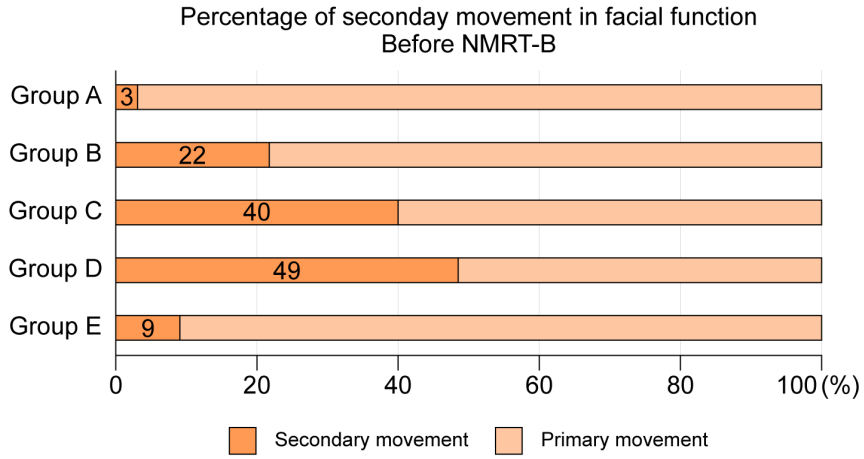
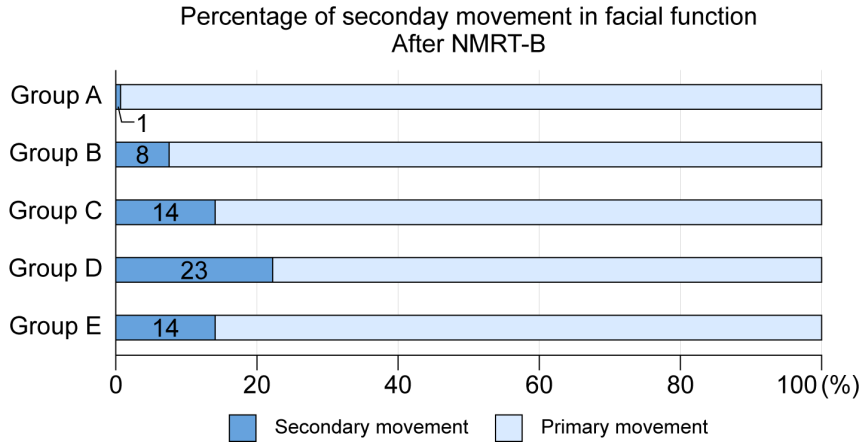
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