Handgrip Strength in One-Month-Old Infants: How Strong Are They?

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Background

Decreased muscle strength is often discussed in relation to developmental disorders.

However, muscle strength during early stages of life has not been systematically evaluated.

A newly designed dynamometer for babies allows us to assess handgrip strength at early life stages.

Purpose

To investigate the feasibility and performance of the handgrip strength test in one-month-old newborns using the newly designed dynamometer.

Participants

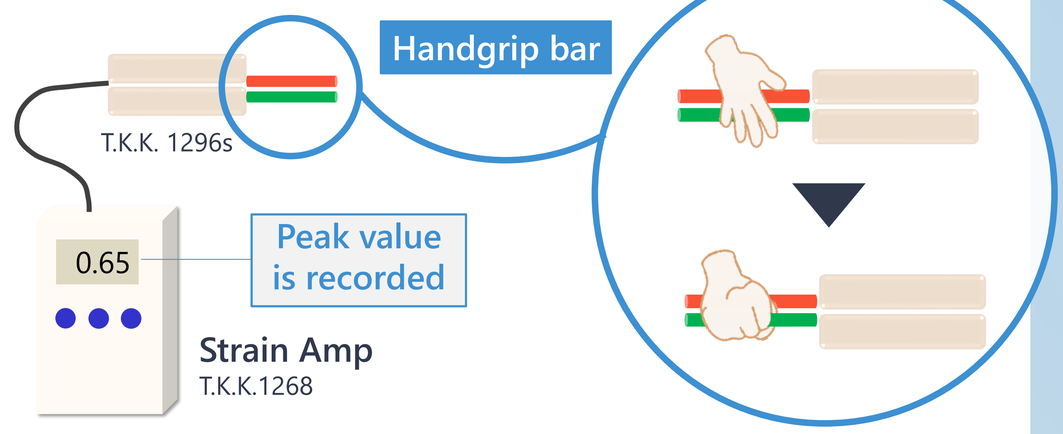
14 healthy term babies (**31.6** ± **3.3** days of age) visiting the hospital for health check-ups

(all singleton; **6/14** girls; **3/14** caesarean section)

Test & Analysis

New dynamometer for babies

[Takei Scientific Instruments Co., Ltd.]



- ▶ Measured peak value of grasp reflex
  - ▶ Right → left → right → left
    - ▶ The highest value → analysis

Results & Discussion

Table 1. Characteristics of the Participants

	Mean ± SD
Maternal age (year)	**34.1** ± **3.5**
Gestational age (wk)	**39.7** ± **1.0**
Maternal Height (cm)	**159.6** ± **4.0**
Maternal pre-pregnancy weight (kg)	**54.9** ± **10.8**
Maternal weight at birth (kg)	**63.7** ± **10.5**
Birth weight (g)	**3106** ± **343**
Birth length (cm)	**50.0** ± **1.1**
Head circumference at birth (cm)	**34.0** ± **0.9**
Chest curcumference at birth (cm)	**32.8** ± **1.4**

Table 2. Test Results

1 kg = 1 kilogram-force ≒ 9.8 newton

Participant	Handgrip Strength (kg)				
	Right 1	Left 1	Right 2	Left 2	Max
A	0.88	0.42	0.45	**0.96**	**0.96**
B	0.27	**0.47**	*NA*	*NA*	**0.47**
C	**0.76**	0.53	*NA*	*NA*	**0.76**
D	0.29	0.27	**0.44**	0.27	**0.44**
E	**0.86**	0.30	*NA*	0.28	**0.86**
F	0.53	**0.53**	*NA*	0.27	**0.53**
G	0.29	0.28	**0.37**	0.32	**0.37**
H	0.36	**0.66**	0.50	0.55	**0.66**
I	0.25	**0.31**	0.29	0.27	**0.31**
J	**0.39**	0.35	0.28	0.37	**0.39**
K	0.20	0.20	*NA*	*NA*	0.20
L	0.41	0.29	*NA*	*NA*	**0.41**
M	**0.53**	0.40	0.43	0.35	**0.53**
N	0.32	**0.59**	0.51	0.51	**0.59**
Mean ± SD (Except K)	**0.56** ± **0.20** kg				

There were some missing data because babies:

- did not grasp the handgrip bar.
- did not show grasp reflex.
- attempted, but values were too weak (<0.2 kg) to be recorded.

Participant (K) could not be tested.

At least two measurements were obtained for each participant (Except for K).

Conclusion

✓ Handgrip strength of children at the age of one month was close to **0.56** kg.

✓ This test appears to be applicable to one-month-old newborns and could further contribute to our understanding of neuromuscular development.

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