

令和元年6月4日現在

機関番号：17701

研究種目：基盤研究(C) (一般)

研究期間：2016～2018

課題番号：16K11809

研究課題名(和文) 口呼吸小児における口唇閉鎖訓練の有効性の検討とスクリーニング法の確立

研究課題名(英文) Examination of effectiveness of lip closure training in mouth breathing children and establishment of screening method

研究代表者

村上 大輔 (Murakami, Daisuke)

鹿児島大学・医歯学域歯学系・助教

研究者番号：80611798

交付決定額(研究期間全体)：(直接経費) 3,500,000円

研究成果の概要(和文)：口呼吸が顔面軟組織に及ぼす形態的影響を調査するために、口呼吸小児を対象とした顔面軟組織の3次元形態を解析した結果、3歳の時点で既に鼻の扁平化や口唇の突出が生じる傾向があり、比較的早期に顎顔面領域の成長に悪影響が生じることも明らかとなった。一方、口呼吸と口唇閉鎖力の関連性を解析したところ、口唇閉鎖力は口呼吸の有無に影響を与える因子であることが明らかとなり、同時に口唇閉鎖力の成長変化について、各年齢の標準値を導出することにも成功した。また、口呼吸に関連する項目は7つの因子に分類できることも示唆され、口呼吸分類スクリーニングの一助になりうる重要な知見を得ることに成功した。

研究成果の学術的意義や社会的意義

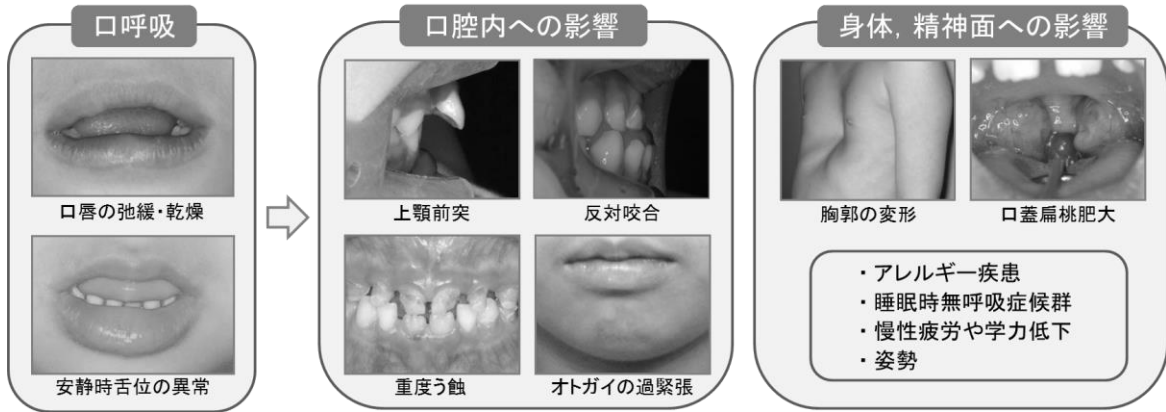
本研究によって口呼吸の原因因子を分類できるようになると、関連医科との連携の必要性を判断する目安になり、専門性を活かした治療に繋がると考えられる。また、小児の口呼吸は増加傾向にあり、小学生の65%に認められると言われていることから、口呼吸とその弊害を抱える小児は非常に多いと考えられる。口呼吸は成長・発育や全身的な疾患に大きく関わっているため、大多数の子どもたちのライフステージの早い時期から介入できれば、将来起こり得る弊害を未然に防ぎ、生涯にわたる健康を獲得できる可能性が高くなることが期待され、その波及効果と普遍性、医療費の削減効果は非常に大きい。

研究成果の概要(英文)：We analyzed the three-dimensional morphological facial soft tissue in mouth breathing children to examine the hypothesis that mouth breathing has an adverse influence on the form of facial soft tissue. The results suggested that mouth breathers had anteriorly prominent subnasale and lips earlier than 3 years of age. We measured the children's lip-closing strength(LCS) with a force device to examine patterns in age-related changes in LCS and factors associated LCS. We showed the LCSs of, or LCS values/measurements for ages 3-12, and found that the acquisition of the daily habit of closing the lips during the daytime is very important among children. We investigated the relevant factors and the interrelationships between factors affecting mouth breathing syndrome among children. The results suggested that mouth breathing syndrome was categorized according to 7 major factors.

研究分野：小児歯科学分野

キーワード：口呼吸 口唇閉鎖力

26bū
 3A2sGMK883)g×Cb\$/x
 DMlpMs8j b4bg6P3/(&
 8bSpMs8j 8g
 7)tmA50p8KZ400U
 8: 6pb0b88711| 8S
 K?K?M680E6S6U
 4:)4A88g@ 6rS246K8M
 z DMG60 & 60 (8Aid4
 b05W Sub64&64)6N91S



II

M

□ 107 P166POEK64M 53 80% bā
 KS6p6528K164
 bl88o%4EKS)64b6l 6SrS4
 A66Pb640KS)YC%6A66Pc4
 Z6G8V
 MSuuE 444 P1R8f 83)blg00yYS
 blxAbgj 8) 463 888be B6x
 s8j 8g6S I 6bE 380 P1RS13KS\
 G6Mfcu 6b3MI 46SV
 46A66P6KZG628
 3664 6M\$010
 6G6g1S
 CbGrp2B7) & A66Pb)E)66M8
 26 8 5M6G663
 75Dwr8: ilb720bl-
 Od7KP166g(P)Sub3b662A
 TEM 664&64)6@
 ArS64b6l 8Z0K6GA66PzI
 K8&E Mbg6M6(87G6S
 7067aGV 266 66j
 6K6S

III

76M628s8jlpMSu66
 KZ)tmA50p8635MSuA66P0)50Di I
 820E88G6d67KP1DE) 8
 A66P0)K0)SbA66P883)g6
 3g06MG6)6K883)bb6*:)A3
 6YI 0?0E S26 666
 2K64&64b06M6MG66%

1->262

26A66P0)6K883)bb6*:)8Z
 3gYI 0G6?06GA66P0)bw0E

14Sb0E
A6P0E83>)bg0EKA6A6P0>6E
0>6aX(1K0>Sb3gA6APg8f
3>)gb6MGA6A6P0>bE
2c 14Sb0E
P17:rGrE74
S 400 &KS

1, 200 P1RZ

04M

400 &0E 1, 200 >
1200 p 1/3 E

> B 28 00# ×
& >1p7
q 0M*

M000Z

b0E 53 8o%6M82/2bE
SY0M8o%&E88o%P7V/GK
S38o%uS50M8K8rS28Z/2A
C6ä E8EM

r A#0
A#02c0b2A6A

1 00Z

82C0V6W

p&8A6A6P0E

M0E2(6u\$)f/:G\

00E

6G4b

s 83>)gb0

83>)gb0E8K01g0Eb

9, 9, p

#

w0P1B

E

0X00E

M VIVID c&0E7360E/SY@.

& 0A6A6P0>0

2070A68i Rkq

M4 eM68: m/M

68: m/c>¥

30 00

18 2>Gb[

36 0: G>¥G

MG&Ks(24)BMGA0>¥

#/

80K8

> B 29> 30 050# ×
0>)E)K00E

& >1p7

A6A6P0>6aX(1K01b

A#00B83>)gb0V:

& 00 0

q A6A6P0>Sb63Q

80%>Sb)YMG0>bE

r A6A6P0>SbA#0

0>SbA6A6PbE

B00>bwE

s 83>)gbB6M0f

0>SE83>)gb6MG0>@

[I pM(A6A6P83>)gb860E

>883>)gb02×

83>)bgE

16 I b880E0E=

I b0)P83>)bB65gB60Sc

/202E

b *

83>)gb1E

K8

t 8B

GpKS8o%G(28864 I X

M0) 8M8BM

2>28Y

83>)I pMg8j 1MSu_

883>)bB6k

80KS21RS83>)b1g00)¥Sbi

I/beKAb: 8888868s

8j 8

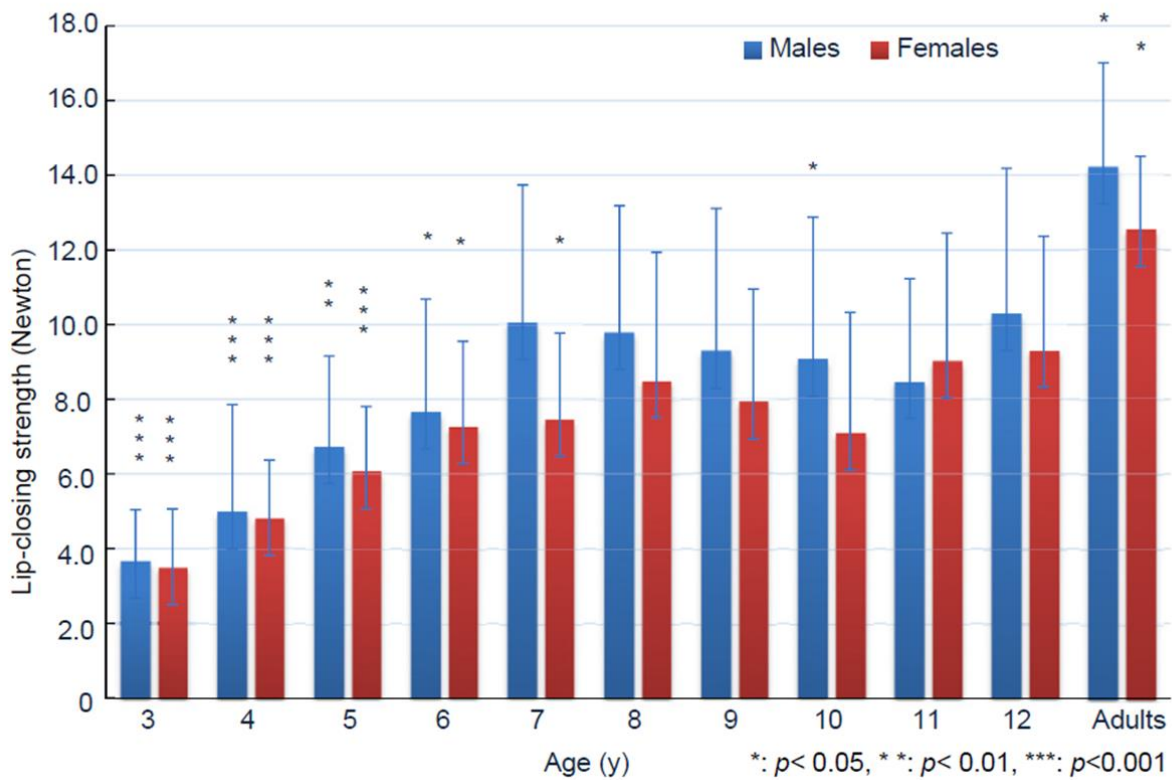
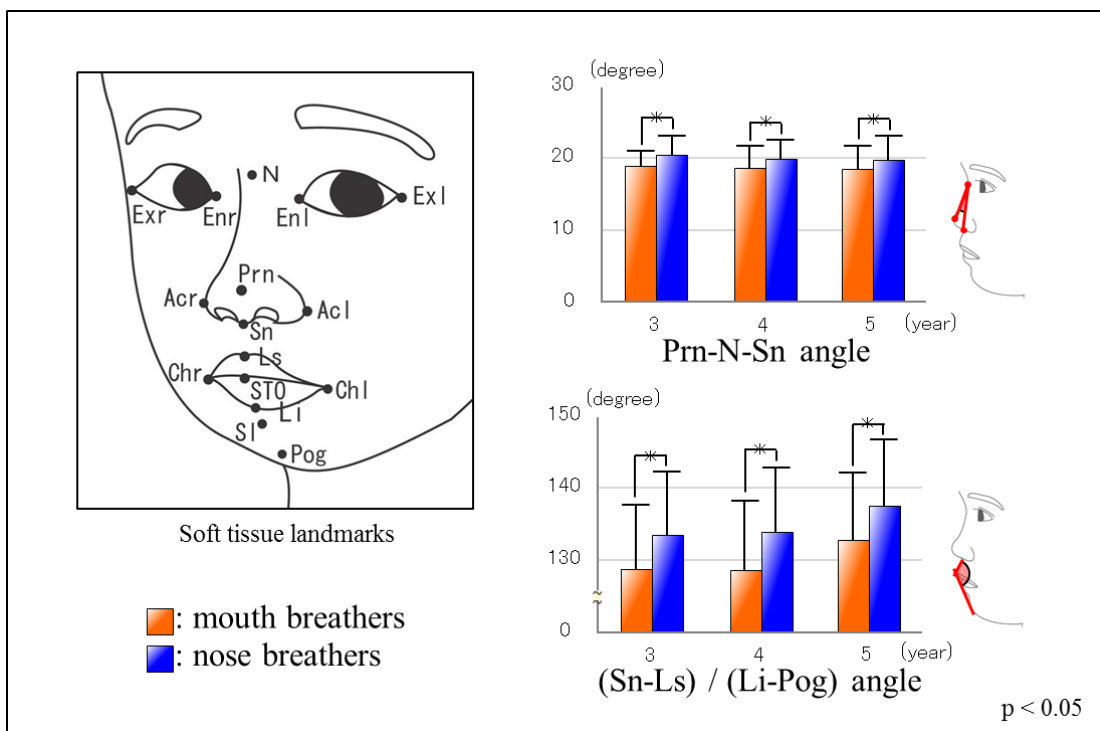
&0¥

M6A6Pb640KSGA6A6Pc0u58j

E6GA6A6PbB6E =

r562440441R
 KS13KSGMfCu0B1\$
 6MI46SV00SG04M80%0X
 bl18AGV&g@
 00GBKS

I & /t/50M^50↑



		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Are your lips droopy?	(Q-29)	0.980	-0.064	-0.015	-0.056	-0.026	-0.102	-0.018
Is your mouth often open during the day?	(Q-18)	0.676	0.089	-0.067	0.106	0.113	-0.055	-0.009
Are your teeth visible between your upper and lower lips?	(Q-28)	0.633	-0.015	0.046	0.000	-0.039	0.066	-0.019
Do you sleep with your mouth open?	(Q-19)	0.533	0.073	-0.109	0.132	0.050	0.074	0.028
Do you have an overbite?	(Q-21)	0.490	-0.087	0.047	0.001	-0.057	0.099	-0.030
Are your lips thick?	(Q-26)	0.432	-0.028	-0.012	-0.123	0.003	0.013	0.191
Is your upper lip turned upward?	(Q-27)	0.427	0.064	0.094	-0.076	0.015	0.003	0.071
Does your nose become stuffed easily during the day?	(Q-6)	0.017	0.930	-0.012	0.000	-0.028	-0.073	-0.019
Does your nose become stuffed easily while sleeping?	(Q-7)	0.040	0.828	-0.062	0.091	-0.010	-0.069	-0.026
Do you sneeze often?	(Q-8)	-0.042	0.738	0.029	-0.050	0.042	0.021	0.011
Do you often have a runny nose?	(Q-9)	-0.054	0.671	0.047	-0.100	0.021	0.089	-0.018
Do you often have a sore throat?	(Q-11)	-0.005	0.415	0.053	0.000	-0.099	0.126	0.104
Do your meals consist of small servings?	(Q-36)	0.027	-0.024	0.703	-0.017	-0.134	-0.040	-0.013
Do you eat fast?	(Q-39)	-0.018	0.000	0.598	0.023	-0.057	-0.092	0.079
Are you a picky eater?	(Q-40)	-0.027	0.077	0.563	0.041	0.041	0.034	-0.079
Do you have food left in your mouth for a long time?	(Q-44)	0.123	-0.020	0.435	-0.043	0.155	0.016	0.021
Do you prefer soft food?	(Q-37)	-0.042	0.018	0.427	0.062	0.220	0.033	0.026
Do people tell you that you have bad breath in the morning?	(Q-16)	0.002	-0.067	0.003	0.975	-0.035	0.004	-0.044
Do people tell you that you have bad breath during the day?	(Q-17)	-0.061	0.021	0.043	0.768	0.017	-0.002	0.083
Are you a noisy eater?	(Q-42)	-0.096	-0.008	-0.039	0.014	0.935	0.004	0.083
Do you keep your mouth closed when you eat?	(Q-43)	-0.140	0.027	-0.056	0.048	-0.688	-0.004	0.126
Are your teeth easily stained?	(Q-33)	0.010	-0.001	-0.107	-0.041	0.008	0.756	0.024
Do you have tartar build-up?	(Q-35)	-0.029	0.034	-0.011	0.026	0.033	0.669	0.009
Are your gums often swollen?	(Q-31)	0.189	0.032	0.134	0.051	-0.059	0.446	-0.063
Is your mouth often dry?	(Q-15)	0.026	-0.002	-0.003	0.019	0.037	-0.043	0.916
Are your lips often chapped?	(Q-25)	0.104	0.022	0.022	0.014	-0.070	0.065	0.628

Factor 1 Factor 2 Factor 3 Factor 4 Factor 5 Factor 6 Factor 7
 Incompetent lip seal Diseases of the nose and throat Eating and drinking habits Bad breath Problems with swallowing and chewing Condition of teeth and gums Dry lips

3 >Z\$1e ...
 7\$1A0E 2 6

1. Sai toh I, Inada E, Kaihara Y, Nogami Y, Murakami D, Kubota N, Sakurai K, Shirazawa Y, Sawami T, Goto M, Nosou M, Kozai K, Hayasaki H, Yamasaki Y, An exploratory study of the factors related to mouth breathing syndrome in primary school children, Archives of oral biology&1w> (92) 57-61, 2018.

2. Inada E, Sai toh I, Murakami D, Yu Y, Tomiyama D, Yamasaki Y, Evaluation and Comparison of Arm-Joint and Toothbrush Motion Between Pen Grip and Palm Grip During Tooth Brushing, Journal of Oral Hygiene & Health&1w> 6(2), 2018.

3. Murakami N, Nakamura Y, Nakajima T, Sasakawa U, Nakakura-Ohshima K, Murakami T, Kurosawa M, Iwase Y, Murakami D, Sai toh I, Inada E, Yamasaki Y, Hayasaki H, Oral feeding behavior during a whole meal, Dental, Oral and Craniofacial Research&1w> , 2017.

4. Sai toh I, Inada E, Kaihara Y, Nogami Y, Murakami D, Ishitani N, Sawami T, Iwase Y, Nakajima T, Kubota N, Sakurai K, Tsujii T, Shirazawa Y, Hanasaki M, Kurosawa M, Goto M, Nosou M, Kozai K, Yamasaki Y, Hayasaki H, The relationship between lip-closing strength and the related factors in a cross-sectional study, Pediatric Dentistry Journal&1w> 27(3) 115-120 2017.

1. 5 6
 1. ≤. (M1, 5Vw(Ö, 7. ≤, NÖ, 93\, 7g°, 3*
 960Y, 56 G

2. 3*
 2. 7. ≤, 93\, ≤. (M1, NÖ, 5Vw(Ö, 55 G

3. 5Vw(Ö, ≤. (M1, 7. ≤, NÖ, 93\, 7g°, 960Y,
 55 G

4. 56, Jj, lce, &x, 3*, YF, 93\, .. (&6o, 3/4

EM, 2017 " 5 v &, 55 G

5. 3*, Jj, Ice, EM, M1, pa, 5Vw(O, f, 2016 " 10 v

6. Nogami Y, Saitoh I, Inada E, Kaihara Y, Murakami D, Takemoto Y, Sawami T, Nosou M, Sakurai K, Matsumoto N, Soda M, Nakajima T, Kozai K, Yamasaki Y, Hayasaki H, Does lip-closing strength develop in parallel to age in children, 10th PDAA, May 26-28, 2016, Tokyo.

7. Inada E, Saitoh I, Oku T, Murakami D, Kaihara Y, Takemoto Y, Morizono K, Kubota N, Hayasaki H, Yamasaki Y: Morphological characteristics of facial soft tissue of mouth-breathing children, 10th PDAA, May 26-28, 2016, Tokyo.

4> 20)

(1)2(*, #), EMI, Inada, d2p, 4p, 1n, 30448568

2(*N, YASUTAKA, Kaihara, d2p, 4p, M5, 60274106

□ 81, □ M1, 81, SAI TOH, Issei, 81, □, 81, □, 81M, □, 81, 90404540