

Swallowing and oral-sensorimotor characteristics in a sample of young hospitalised children with severe acute malnutrition

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APPENDIX 1: Supplemental material

Participant matching criteria

Table S1: Participant matched criteria (n=90)

Characteristic	Research Group n=45		Control Group n=45		p-value [#]
Age in months (M, SD)	45	15.98 (8.03)	45	15.96 (8.08)	0.965
Gender (%)					
Female	20	44.4	20	44.4	1.000
Male	25	55.6	25	55.6	1.000
Anthropometry					
Weight in kilograms (M, SD)	45	10.21 (2.31)	45	7.30 (1.74)	<0.001*
Height in centimeters (M, SD)	45	78.20 (8.40)	45	74.02 (9.68)	0.029*
MUAC in centimeters (M, SD)	45	14.19 (1.37)	45	11.52 (1.45)	<0.001*
TB (%)					
No	33	73.3	38	84.4	0.114
Yes	12	26.7	7	15.6	0.114
HIV (%)					
Exposed	27	60.0	24	53.3	0.523
No	22	48.9	23	51.1	0.833
Yes	23	51.1	22	48.9	0.833
Income per person per month in ZAR (M, SD)	45	920.32 (572.34)	45	1026.29 (682.94)	0.295
Paternal employment (%)					
No	13	28.9	11	24.4	0.090
Yes	16	35.6	25	55.6	0.090
Housing status (%)					
Informal dwelling	15	33.3	16	35.6	0.824
Stay with others	12	26.7	11	24.4	0.809
Renting	5	11.1	4	8.9	0.725
Own the property	8	17.8	7	15.6	0.764
Free housing	5	11.1	7	15.6	0.535
Transport access (%)					
Public transport	44	97.8	44	97.8	1.000
Own car	1	2.2	1	2.2	1.000
Maternal education in years (M, SD)	42	10.31 (2.66)	44	11.27 (2.15)	0.087

* significant difference (p<0.05)

[#] if M and SD reported, the p-value corresponds to the MW test, otherwise, if percentages are reported, the p-value corresponds to the two-proportions z-test

FPL, Food poverty line; HIV, human immunodeficiency virus; M, mean; MUAC, mid-upper arm circumference; SD, standard deviation; TB, tuberculosis; %, percentage.

Oral-sensorimotor and swallowing characteristics

Table S2: Oral-sensorimotor skills and signs of aspiration during the SOMA (n=90)

Consistency	Oral-sensorimotor characteristics/ Signs of aspiration	Research Group n=45		Control Group n=45		z-test p-value
		n	Percentage (%)	n	Percentage (%)	
Puree	Oral-preparatory phase					
	Graded jaw opening	19	43.2	35	77.8	0.001*
	Lower lip – draws in around spoon	27	61.4	41	91.1	0.001*
	Upper lip - removes food off spoon	29	65.9	41	91.1	0.004*
	Lower lip – assists cleaning	18	40.9	33	73.3	0.002*
	Drooling	15	34.1	7	15.6	0.043*
	Holding food in the mouth	27	61.4	10	22.2	<0.001*
	Head extension	9	20.5	2	4.4	0.022*
	Pharyngeal phase					
	Smooth swallow sequence	22	50.0	40	88.9	<0.001*
	Tongue protrusion	23	52.3	17	37.8	0.169
	Anterior food loss	17	38.6	8	17.8	0.029*
	Multiple swallows	20	45.5	9	20.0	0.010*
	Food pocketing	9	20.5	2	4.4	0.022*
	Signs of aspiration					
	Facial grimace	4	9.1	3	6.7	0.671
	Wet vocalization	8	18.2	2	4.4	0.040*
	Gagging	6	13.6	0	0	0.010*
	Coughing	7	15.9	2	4.4	0.073
Semi-solid	Oral-preparatory phase					
	Graded jaw opening	19	43.2	26	63.4	0.062
	External jaw stabilisation required	14	31.8	1	2.4	<0.001*
	Associated jaw movements	30	68.2	16	39.0	0.007*
	Drooling	19	43.2	9	22.0	0.037*
	Holding food in the mouth	23	52.3	12	29.3	0.031*
	Head extension	13	29.5	6	14.6	0.099
	Slow bolus formation	31	70.5	16	39.0	0.004*
	Pharyngeal phase					
	Smooth swallow sequence	18	40.9	23	56.1	0.161
	Tongue protrusion	27	61.4	15	36.6	0.022*
	Lip closure during swallow	32	72.7	36	87.8	0.082
	Anterior food loss	14	31.8	6	14.6	0.062
	Multiple swallows	25	56.8	8	19.5	<0.001*
	Food pocketing	18	40.9	3	7.3	<0.001*
	Signs of aspiration					
	Facial grimace	5	11.4	2	4.9	0.277
	Wet vocalization	6	13.6	1	2.4	0.061
	Gagging	2	4.5	0	0	0.167
Coughing	10	22.7	1	2.4	0.005*	
Solid	Oral-preparatory phase					
	Graded jaw opening	14	40.0	23	59.0	0.064
	Lower lip – draws in around spoon	19	54.3	33	84.6	0.004*
	Upper lip - removes food off spoon	23	65.7	30	76.9	0.286
	Drooling	15	42.9	8	20.5	0.038*
	Holding food in the mouth	22	62.9	9	23.1	0.001*
	Head extension	15	42.9	7	17.9	0.019*
	Slow bolus formation	27	79.4	13	33.3	<0.001*

	Pharyngeal phase					
	Smooth swallow sequence	9	25.7	20	51.3	0.024*
	Tongue protrusion	13	37.1	26	66.7	0.011*
	Anterior food loss	14	40.0	10	25.6	0.188
	Multiple swallows	27	77.1	16	41.0	0.002*
	Food pocketing	15	44.1	5	12.8	0.003*
	Signs of aspiration					
	Facial grimace	10	28.6	1	2.6	0.002*
	Wet vocalization	6	17.1	1	2.6	0.032*
	Gagging	6	17.1	0	0	0.007*
	Coughing	9	25.7	1	2.6	0.004*
Cracker	Oral-preparatory phase					
	Graded jaw opening	8	30.8	20	62.5	0.016*
	Small vertical excursions	11	42.3	22	68.8	0.043*
	External jaw stabilisation required	9	34.6	6	18.8	0.170
	Lip closure during bite	15	57.7	28	87.5	0.010*
	Sustained bite	6	23.1	15	46.9	0.061
	Drooling	17	65.4	13	40.6	0.061
	Holding food in the mouth	20	80.0	20	62.5	0.152
	Head extension	14	53.8	17	53.1	0.315
	Slow bolus formation	20	90.9	20	71.4	0.087
	Pharyngeal phase					
	Tongue protrusion	13	50.0	9	28.1	0.088
	Anterior food loss	16	61.5	20	62.5	0.940
	Multiple swallows	20	90.9	20	71.4	0.087
	Food pocketing	15	68.2	6	21.4	0.001*
	Signs of aspiration					
	Facial grimace	2	8.3	2	6.5	0.790
	Wet vocalization	4	16.7	1	3.2	0.086
	Gagging	3	11.5	0	0	<0.001*
	Coughing	12	50.0	3	9.7	0.001*
Bottle	Oral-preparatory phase					
	Anticipatory mouth opening	25	96.2	16	100	0.427
	Upper lip – seals tightly	22	84.6	15	93.8	0.375
	Lower lip – seals tightly	14	53.8	3	18.8	0.024*
	Small vertical excursions	22	84.6	16	100	0.099
	Holding liquid in the mouth	7	26.9	1	5.9	0.083
	Head extension	2	7.7	1	5.9	0.820
	Pharyngeal phase					
	Smooth swallow sequence	13	50.0	9	56.3	0.694
	Lip closure during swallow	21	80.8	15	93.8	0.243
	Anterior liquid loss	4	15.4	0	0	0.089
	Multiple swallows	8	30.8	0	0	0.011*
	Signs of aspiration					
	Facial grimace	1	3.8	0	0	0.413
	Wet vocalization	1	3.8	0	0	0.413
	Coughing	1	3.8	0	0	0.413
Trainer cup	Oral-preparatory phase					
	Small vertical excursions	16	84.2	12	66.7	0.214
	External jaw stabilisation required	7	36.8	4	22.2	0.331
	Holding liquid in the mouth	8	42.1	11	61.1	0.248
	Head extension	12	63.2	9	50.0	0.419
	Pharyngeal phase					
	Tongue protrusion	11	57.9	7	38.9	0.248

	Anterior liquid loss	7	36.8	9	50.0	0.514
	Multiple swallows	13	68.4	10	55.6	0.898
	Signs of aspiration					
	Facial grimace	4	21.1	3	16.7	0.734
	Wet vocalization	5	26.3	2	11.1	0.238
	Gagging	2	10.5	6	33.3	0.092
	Coughing	9	47.4	4	22.2	0.109
	Choking	8	42.1	1	5.6	0.010*
Open cup	Oral-preparatory phase					
	Small vertical excursions	16	43.2	24	66.7	0.044*
	Holding liquid in the mouth	19	51.4	13	36.1	0.190
	Head extension	19	51.4	10	27.8	0.040*
	Pharyngeal phase					
	Tongue protrusion	24	64.9	17	47.2	0.129
	Anterior liquid loss	32	86.5	23	63.9	0.025*
	Multiple swallows	26	70.3	14	38.9	0.007*
	Signs of aspiration					
	Facial grimace	11	29.7	1	2.8	0.002*
	Wet vocalization	14	37.8	4	11.1	0.008*
	Gagging	11	29.7	3	8.3	0.020*
	Coughing	16	43.2	7	19.4	0.029*
	Choking	14	37.8	3	8.3	0.003*

* significant difference (p<0.05)

%, percentage.