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ORIGINAL ARTICLE

The masseteric nerve: An anatomical study in Thai population with an emphasis on its use in facial reanimation

Apichai Angspatt*, Chirayu Pannanusorn

Division of Plastic and Reconstructive Surgery, Department of Surgery, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Received 11 December 2016; received in revised form 20 July 2017; accepted 7 August 2017

KEYWORDS

Masseteric nerve;
Nerve to masseter;
Facial palsy;
Facial paralysis;
Facial reanimation

Summary *Background:* The use of the masseteric nerve has been escalated as a donor nerve for facial reanimation in facial palsy patient (Wang et al., 2014; Manktelow et al., 2006; Klebuc, 2011; Bianchi et al., 2012; Zuker et al., 2000; Bae et al., 2006; Terzis, Konofaos, 2013; Terzis, Olivares, 2009; Bianchi et al., 2014). Previous studies had been done in Euro-Caucasian cadavers (Kaya et al., 2014). However, difference in anatomical details does exist between Asian and Euro-Caucasian population (Tzou et al., 2005; Farkas et al., 2005). In this study, we have conducted a detailed anatomical study of masseteric nerve in adult Thai cadavers which might elaborate better details of masseteric nerve anatomy in Asian population. *Methods:* Twenty eight hemifaces from 14 adult Thai non-formaldehyde preserved soft cadavers were used in this study. The anatomical pathway of the masseteric nerve was defined relating to four surgical landmarks which are auricular tragus, zygomatic arch, posterior border of the temporomandibular joint, and alar base.

Results: The suitable starting area for the masseteric nerve dissection is 3.7 ± 0.4 cm anterior to the auricular tragus at the level of 0.8 ± 0.2 cm inferior to the zygomatic arch. The nerve was found 1.1 ± 0.2 cm deep to the superficial surface of the masseteric fascia and 1.7 ± 0.2 cm anterior to the posterior border of the temporomandibular joint. The point where the nerve giving off its first branch as it courses distally is 7.3 ± 0.7 cm from the ipsilateral alar base. The mean diameter of this nerve is 1.59 ± 0.42 mm.

Conclusion: The anatomy of the masseteric nerve during its course in the muscle is consistent. In our study, the details of its anatomy is slightly different from the previous works which were performed in the Euro-Caucasian cadavers.

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* Corresponding author. Division of Plastic and Reconstructive Surgery, Department of Surgery, Faculty of Medicine, Chulalongkorn University, Rama IV Road, Phatumwan, Bangkok 10330, Thailand. Fax: +66 2 256 4120.

E-mail address: aangspatt@hotmail.com (A. Angspatt).

<http://dx.doi.org/10.1016/j.asjsur.2017.08.003>

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Please cite this article in press as: Angspatt A, Pannanusorn C, The masseteric nerve: An anatomical study in Thai population with an emphasis on its use in facial reanimation, Asian Journal of Surgery (2017), <http://dx.doi.org/10.1016/j.asjsur.2017.08.003>

1. Introduction

The use of masseteric nerve as a donor motor nerve for facial reanimation has been escalated due to its advantages.^{2,3,5–8,12,13} Facial paralysis is a significant disability either from an esthetic or functional view point.¹⁴ It characterized by the inability to show any emotional expression. In the long term, patients also suffer from the deviation of face resulting from laxity and atonality of the ipsilateral facial muscles. Ectropion, lagophthalmos, impaired articulation, and difficulty with chewing are direct consequences of this disability.¹⁵ The micro-neurovascular transplant of a free functioning muscle and nerve transfer have shown to be successful procedures in facial reanimation. The masseteric nerve provides powerful and synergistic reinnervation capability.^{1,4,9} The nerve location is closed to facial nerve and the transplanted muscle used for smile reanimation. It is expendable since there are other muscles that compensate for the denervation of the masseteric nerve. The main disadvantage of using this nerve is the difficulty of its dissection. Previous studies in Euro-Caucasian cadavers had been performed to demonstrate its course in the masseter muscle.^{10,16,17} We had studied the anatomical details of the masseteric nerve in Thai cadavers to elaborate any different details in the nerve's course and size in order to facilitate its use in Asian population.

2. Materials and methods

Twenty eight hemifaces from fourteen adult Thai non-formaldehyde preserved soft cadavers were dissected in this study. Through the modified rhytidectomy with neck extension incision a cheek flap and a SMAS flap were separately raised (Fig. 1). The zygomatic arch and the masseteric muscle sheath were identified. The masseteric nerve was identified by dividing the masseter muscle from its attachment to the zygomatic arch starting from the auricular tragus. When the masseteric nerve was found it was traced down through its course in the muscle until it gave off its branches. Measurements were done using a standard plastic operating room ruler. Four common relating surgical landmarks were used which were auricular tragus, zygomatic arch, posterior border of temporomandibular joint, and alar base. We measured the distance from the inferior border of the zygomatic arch to the masseteric nerve at the highest level it was seen in the muscle. The distance from the auricular tragus and posterior border of the temporomandibular joint to the masseteric nerve was recorded. The depth of the nerve compared to the masseteric sheath was also recorded. We measured the distance from the most distal part of the nerve before it gave off minor branches to the ipsilateral alar base. The diameter of the nerve at this point was also recorded.

Statistics: Descriptive statistic analysis was used. Means with standard deviations were reported.

3. Results

The demographic data of the cadavers was shown in Table 1.

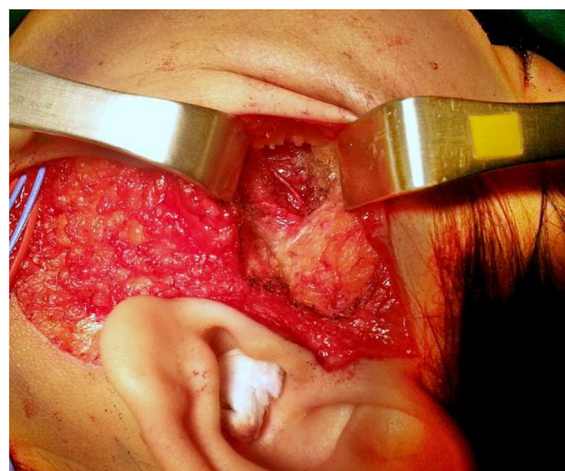


Figure 1 Nerve to masseter.

Table 1 The demographic data of the cadavers.

Number	Sex	Side	Age	Height (cm.)	Body weight (kg.)
1	F	L	69	158	60
2	F	R	69	158	60
3	F	R	53	155	58
4	F	L	53	155	58
5	F	R	68	165	60
6	F	L	68	165	60
7	M	R	72	175	60
8	M	L	72	175	60
9	M	R	81	165	58
10	M	L	81	165	58
11	M	R	76	150	60
12	M	L	76	150	60
13	M	R	72	173	55
14	M	L	72	173	55
15	M	R	68	157	58
16	M	L	68	157	58
17	F	L	67	156	50
18	F	R	67	156	50
19	F	R	64	170	60
20	F	L	64	170	60
21	M	R	47	175	70
22	M	L	47	175	70
23	F	R	87	158	85
24	F	L	87	158	85
25	M	R	40	159	60
26	M	L	40	159	60
27	F	R	90	160	45
28	F	L	90	160	45
Mean			68.14	162.57	59.92
SD			14.88	8.00	10.15

The distance from the auricular tragus to the masseteric nerve anteriorly is 3.7 ± 0.4 cm along the zygomatic arch in the anteroposterior dimension. The distance from the masseteric nerve to the posterior border of the temporomandibular joint is 1.7 ± 0.2 cm. The nerve was located

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