



## Analysis of mortality cases related to jaw surgery reported in the mass media: a secondary publication

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Orthognathic surgery has been one of the most common treatments for skeletal deformities of the jaw, such as prognathism or facial asymmetry. Due to the media, this procedure is known to the Korean general public as “two-jaw surgery.” Although orthognathic surgery is recommended by professionals as the safe gold standard of treatment for jaw deformities, the social perspective of orthognathic surgery is not good. “Two-jaw surgery” is considered dangerous and associated with adverse side effects. This erroneous negative perception of orthognathic surgery was established due to the many media reports of serious complications, such as mortality. To correct and improve the public awareness for orthognathic surgery, it is important to meticulously analyze such cases.

Despite the negative public perception, the many studies on complications of orthognathic surgery have shown that it is a safe operation that seldom has complications<sup>1,2</sup>. Serious complications including mortality have almost never been reported in scientific journals. In Korea, there was a single case of mortality after orthognathic surgery at the Department of Plastic Surgery of Inha University Hospital (Incheon, Korea) in 2013<sup>3</sup>. Other cases of mortality after orthognathic surgery have been reported in the media such as newspapers and broadcasts.

There is no official statistical data or study about fatali-

ties related to orthognathic surgery, except for a study by the research team of the Department of Plastic Surgery of Inha University Hospital<sup>4</sup>. In their study, media reports of serious complications such as vegetative state and death after orthognathic surgery were searched through the internet. The cause of complications was analyzed, and the prevention methods were described. However, that study had several limitations because some media reports are no longer available online. Also, some references had low reliability because of the absence of the exact date or the time of the accident. Some data were even double-counted because they were analyzed according to the time of press release.

To overcome the double-counting problem of the study by Inha University Hospital, the complication cases were analyzed based on the time of the accidents, and not on the time of the press release. Media reports of serious complication cases such as vegetative state or death related to jaw surgery were searched from January 1, 2000 to March 31, 2016. The type of surgery included orthognathic surgery and facial contouring surgery, since the media has a tendency to confuse the two terms. Search keywords were “two jaw surgery,” “jaw surgery,” “contouring surgery,” “plastic surgery,” “death,” “side effect,” and “complication.” The titles of reports were checked first, and then the articles were reviewed to determine whether they were related to complications of surgery. In order to increase the reliability of information, the cases that included concise information on the accident (date and time of accident/death), patient (name, sex, age, etc.), and hospital were included in this study.

A total of 14 cases were included in our study.(Table 1, Appendix 1) Among the 14 cases, 10 occurred during facial contouring surgery and 4 occurred during orthognathic surgery. The causes of death were bleeding (2 cases), respiratory problems (4 cases; 2 cases of airway obstruction and 2 cases

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**Table 1.** Mortality cases due to jaw surgery reported in the mass media

Case No.	Date of surgery (mo/day/yr)	Date of death (mo/day/yr)	Surname of patient (sex/age [yr])	Type of surgery	Reason of death	Hospital
1	8/5/2000	8/6/2000	Yang (female/31)	Facial contouring surgery	Bleeding	Plastic surgery
2	3/19/2001	3/20/2001	Kim (female/20)	Facial contouring surgery	Bleeding	Plastic surgery
3	2/2005	2/2005	Lee (24)	Facial contouring surgery	Airway obstruction	Plastic surgery
4	8/1/2005	10/4/2005	Park (female /27)	Orthognathic surgery	Respiratory insufficiency	Unknown
5	8/11/2006	8/19/2006	Lee (female/26)	Facial contouring surgery	Brain damage by malpractice	Plastic surgery
6	1/4/2008	1/7/2008	Hwang (female/29)	Facial contouring surgery	Problems related with general anesthesia	Plastic surgery
7	1/9/2008	3/2008	Yoon (male/20)	Orthognathic surgery	Problems related with general anesthesia	Dentistry
8	2/1/2008	2/1/2008	Kim (female/20)	Facial contouring surgery	Unknown	Plastic surgery
9	4/30/2008	4/30/2008	Kim (female/25)	Facial contouring surgery	Respiratory insufficiency	Plastic surgery
10	6/24/2013	7/24/2013	(female/30)	Facial contouring surgery	Unknown	Plastic surgery
11	10/17/2013	10/26/2013	Lee (female/22)	Facial contouring surgery	Unknown	Plastic surgery
12	2/28/2014	3/2/2014	Bae (male/33)	Orthognathic surgery	Airway obstruction	Plastic surgery
13	12/19/2014	12/19/2014	Jung (female/21)	Facial contouring surgery	Unknown	Plastic surgery
14	3/7/2016	3/10/2016	(female/24)	Orthognathic surgery	Unknown	Plastic surgery

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of dyspnea), malpractice (1 case), and unknown cause (6 cases).

Among the 14 mortality cases related to jaw surgery, only 4 were associated with orthognathic surgery. Some mortality cases due to facial contouring surgery were misreported as being due to orthognathic surgery. This may have led to the misconception of orthognathic surgery being a dangerous surgery.

The most common cause of death after jaw surgery was respiratory problems, such as airway obstruction and dyspnea. Respiratory complications can occur during or after orthognathic surgery<sup>3,5</sup>. To prevent such complications, a thorough understanding and preparation for these complications are essential. Patients should be monitored closely, and various methods to maintain the airway, such as nasal and oral airway, laryngeal mask airway, and cricothyroidotomy, should always be prepared. It is recommended to avoid rigid intermaxillary fixation with wire until the patient is fully recovered from anesthesia.

Excessive bleeding during jaw surgery is associated with the experience of the surgeon. According to the literature, excessive bleeding is seldom encountered with jaw surgery because of greater operator experience and improved hypotensive anesthetic techniques<sup>6,7</sup>. Nevertheless, inexperience in the surgical procedures or handling of surgical instruments can lead to patient death owing to excessive bleeding. The mortality case from brain damage during reduction malarplasty (Case 5) resulted from the inexperience of the surgeon.

Two cases of mortality were related to anesthesia. Of these, a case of mortality that occurred during orthognathic surgery (Case 7) is suspected to be due to malignant hyperthermia.

For early detection and treatment of malignant hyperthermia, it is recommended that body temperature during anesthesia and concentration of carbon dioxide in the respiratory gases with capnography should be monitored, and dantrolene, known as treatment medication for malignant hyperthermia, should be prepared. Recently, the mortality rate from malignant hyperthermia has decreased due to proper preparation<sup>8</sup>.

There were four reported mortality cases associated with orthognathic surgery in the past 16 years. Considering that there are about 5,000 cases of orthognathic surgery performed every year in Korea<sup>9</sup>, the rate of mortality is extremely low. Serious complications such as death can be prevented if an experienced surgeon performs the surgery and all necessary safety equipment is prepared. Thus, orthognathic surgery appears to be a safe procedure.

### Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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**Appendix 1.**

Case No.	Mass media, date of report (mo/day/yr)	Website
1	Yonhap News, 8/8/2000	<a href="http://news.naver.com/main/read.nhn?mode=LSD&amp;mid=sec&amp;sid1=102&amp;oid=001&amp;aid=0000019723">http://news.naver.com/main/read.nhn?mode=LSD&amp;mid=sec&amp;sid1=102&amp;oid=001&amp;aid=0000019723</a>
2	Hankook-ilbo, 3/23/2001	<a href="http://news.naver.com/main/read.nhn?mode=LSD&amp;mid=shm&amp;sid1=102&amp;oid=038&amp;aid=0000060405">http://news.naver.com/main/read.nhn?mode=LSD&amp;mid=shm&amp;sid1=102&amp;oid=038&amp;aid=0000060405</a>
3	Kookmin-ilbo, 9/6/2006	<a href="http://news.naver.com/main/read.nhn?mode=LSD&amp;mid=shm&amp;sid1=102&amp;oid=005&amp;aid=0000256242">http://news.naver.com/main/read.nhn?mode=LSD&amp;mid=shm&amp;sid1=102&amp;oid=005&amp;aid=0000256242</a>
4	Hankyoreh Shinmun, 10/7/2005	<a href="http://www.hani.co.kr/kisa/section-002002000/2005/10/002002000200510071501739.html">http://www.hani.co.kr/kisa/section-002002000/2005/10/002002000200510071501739.html</a>
5	Seoul Shinmun, 8/25/2006	<a href="http://www.seoul.co.kr/news/newsView.php?id=20060825010011">http://www.seoul.co.kr/news/newsView.php?id=20060825010011</a>
6	Kyunghyang Shinmun, 1/11/2008	<a href="http://news.khan.co.kr/kh_news/khan_art_view.html?artid=200801111856271&amp;code=940202">http://news.khan.co.kr/kh_news/khan_art_view.html?artid=200801111856271&amp;code=940202</a>
7	Munhwa-ilbo, 12/29/2010	<a href="http://media.daum.net/society/others/newsview?newsid=20101229141110959">http://media.daum.net/society/others/newsview?newsid=20101229141110959</a>
8	Donga-ilbo, 2/4/2008	<a href="http://news.donga.com/3/all/20080204/8541147/1#">http://news.donga.com/3/all/20080204/8541147/1#</a>
9	SBS, 5/2/2008	<a href="http://news.sbs.co.kr/news/endPage.do?news_id=N1000411611&amp;plink=OLDURL">http://news.sbs.co.kr/news/endPage.do?news_id=N1000411611&amp;plink=OLDURL</a>
10	Money Today, 8/18/2013	<a href="http://www.mt.co.kr/view/mtview.php?type=1&amp;no=2013081814164971735&amp;outlink=1">http://www.mt.co.kr/view/mtview.php?type=1&amp;no=2013081814164971735&amp;outlink=1</a>
11	Nocut News, 10/28/2013	<a href="http://www.nocutnews.co.kr/news/1121130">http://www.nocutnews.co.kr/news/1121130</a>
12	Donga-ilbo, 12/22/2014	<a href="http://news.donga.com/3/all/20141222/68706128/1#">http://news.donga.com/3/all/20141222/68706128/1#</a>
13	Donga-ilbo, 12/22/2014	<a href="http://news.donga.com/3/all/20141222/68706128/1#">http://news.donga.com/3/all/20141222/68706128/1#</a>
14	Chosun-ilbo, 3/11/2016	<a href="http://news.chosun.com/site/data/html_dir/2016/03/11/2016031102982.html">http://news.chosun.com/site/data/html_dir/2016/03/11/2016031102982.html</a>