

The effect of uvulopalatopharyngoplasty without tonsillectomy using local anaesthesia: a prospective long-term follow-up

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Abstract

This paper presents the long-term effect of restricted surgery for snoring and sleep apnoea. Patients with obstructive sleep apnoea (OSAS) (19) or heavy snoring (HS) (36) were studied prospectively for five to seven years after uvulopalatopharyngoplasty without tonsillectomy performed by regular surgical technique using local anaesthesia (LUPP). Five years after surgery, 90 per cent answered a questionnaire. All OSAS patients were offered a polysomnography, and the HS patients were offered a sleep study. Eighty per cent still showed a positive effect on daytime somnolence, and 77 per cent on snoring. Side-effects were reported by 40 per cent; most common was choking (20 per cent) the first year. Eighteen per cent had local problems such as globus sensation. The polysomnography showed that 80 per cent were still 'responders' with an apnoea index (AI) reduction of >50 per cent. None of the HS patients had developed OSAS. In conclusion, LUPP in selected patients with OSAS or HS has a good long-term effect. Side-effects are common, but diminish with time.

Key words: Sleep apnoea syndromes; Snoring; Surgery, operative; Post-operative complications

Introduction

For the last 15 years, uvulopalatopharyngoplasty (UPPP), with or without tonsillectomy, has been the predominate therapy for both obstructive sleep apnoea (OSAS) and heavy snoring. There are few investigations concerning the long-term effect of the surgery, but some reports have shown that after an initial very good effect, more and more patients relapse (Larsson *et al.*, 1994; Janson *et al.*, 1997). One explanation could be that the wrong patients were operated on during the first period after the introduction of the surgical technique (Fujita *et al.*, 1981) – the sickest patients and the heaviest snorers (Gislason *et al.*, 1988a). These patients are no longer treated with surgery, but are instead recommended for continuous positive airway pressure (CPAP) treatment, which usually relieves their disease (Leech *et al.*, 1992; Gislason *et al.*, 1988a). Another modification of the treatment during the later years is that more and more patients are operated on using local anaesthesia as out-patients, usually in a situation where it is regarded as unnecessary to remove the tonsils because they are missing or of small size. This kind of surgery can be performed with or without laser assistance (Lindholm *et al.*,

1990; Carefelt, 1991; Hultcrantz *et al.*, 1991; Kamami *et al.*, 1997).

The purpose of the current, prospective study was to investigate the long-term effects of UPPP without tonsillectomy under local anaesthesia in all patients who were operated using ordinary surgical technique during 1990 by the same surgeon (EH) at the ENT-clinic of the University Hospital in Uppsala, Sweden. The effects were evaluated both by collecting the patients' subjective opinion – where special attention was drawn to the discomfort and post-surgical problems the patients had had over time – and through sleep studies. All the patients who had been diagnosed with OSAS before surgery were offered another full polysomnography after five years. A sleep study was offered after seven years to the people who had been operated on for heavy snoring.

Materials and methods

Materials

Fifty-five consecutive patients with complaints of snoring and excessive daytime sleepiness (EDS) were included, 51 men and four women. All patients had initially undergone a sleep study consisting of a full night's data collection while registered as in-

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Accepted for publication: 12 March 1999.

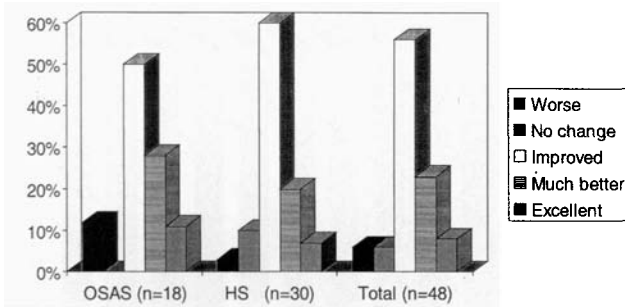


FIG. 1

General health condition five years after surgery.

patients. Oxymetry and thermistor registrations were performed. The patients with suspected OSAS had the diagnosis confirmed with a full night's polysomnography including EEG, EOG (electrooculography), and EMG (submental electromyography). Nineteen patients had OSAS with a median apnoea index (AI) of 27, range seven to 51, age 54 ± 10 years and body mass index (BMI) 27 ± 5 . Thirty-six patients were diagnosed as 'heavy snorers' (HS) with $AI < 5$, age 45 ± 7.6 years and $BMI 26 \pm 7$.

For this study, the patients were selected according to the local status of their pharynx and not according to their AI. The ones operated upon were those with small tonsils situated at a distance from the uvula or those who had been tonsillectomized earlier. All patients also showed traumatic effects of snoring such as hypertrophy of the uvula or redundant tissue of the tonsillar pillars. They had to have strong motivation not only for the surgical treatment, but also for necessary changes of lifestyle - to stop sleeping on their backs, reduce weight, sleep longer, and to consume less alcohol.

The patients were operated on under local anaesthesia, except for one who preferred general anaesthesia for psychological reasons. Most patients were treated in day-surgery. Only three were supervised in the ward overnight for special medical reasons such as diabetes, angina pectoris, and high blood pressure. No special monitoring was necessary besides blood pressure check-ups and measurements of blood glucose levels.

Method

The procedure was carried out under local anaesthesia. First, a lidocaine spray (Xylocaine® Astra) was applied to reduce the vomiting reflex.

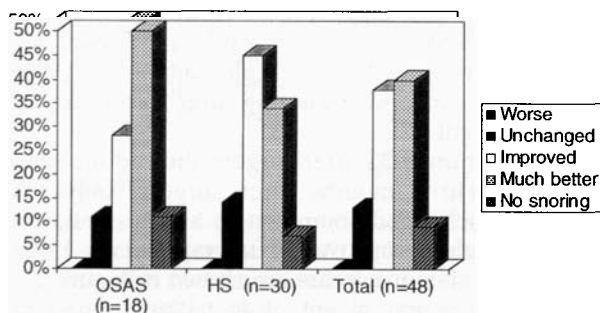


FIG. 2

Snoring, five years after surgery.

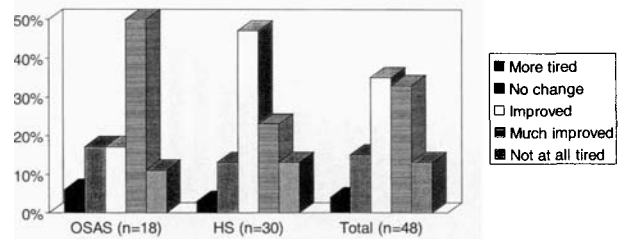


FIG. 3

Degree of daytime tiredness five years after surgery.

Then 15 cc of lidocaine, one per cent with adrenaline, was injected under the mucosa at both sides of the uvula, around the uvular arteries. The anaesthetics diffused under the mucosa down to the tonsils and the result, in addition to the anaesthesia, was a vasoconstriction reducing the bleeding and also a layer for dissection. The surgical technique used was the traditional Fujita technique (Fujita *et al.*, 1981). Removal of the uvula and redundant tissue of the edge of the soft palate and the posterior pillars was performed, pulling the posterior pillar forward suturing them to the anterior pillars thereby increasing the epipharyngeal passage. Lymphoid tissue in the upper part of the tonsillar folds could be removed, but the main bulk of the palatine tonsils was not touched. Good communication between the surgeon and patient was absolutely necessary all the time. All patients had an intravenous cannula with an ongoing slow infusion of saline/glucose (Rehydrex® with glucose 25 mg/ml, Pharmacia and Upjohn). If the patient experienced the situation as too difficult, small doses, (0.5 mg) of intravenous midazolam (Dormicum®, Roche) were offered. During surgery, an ECG was connected for patients with cardiopulmonary risk. By pacing the operation and by speaking calmly to the patient, the surgeon assisted with keeping the patient's heart rate below 100 beats per minute.

Generally, patients could leave the hospital within four to eight hours. Their general condition was very little influenced by the surgery. However, we required that they have someone at home who could observe and care for them, especially during the first night. They were on sick-leave for 10 days and used diklonfenac (Supp. Voltaren®, Ciba-Geigy) 50 mg × 3 and paracetamol 500 mg × 8 as pain relievers together with penicillin-V 1 g × 2 to reduce

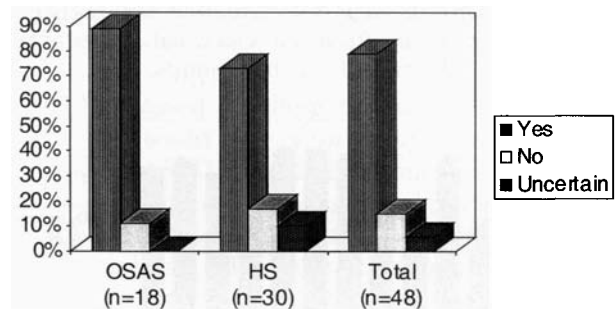


FIG. 4

Patient attitude to 'recommend' LUPP to others, five years after surgery.

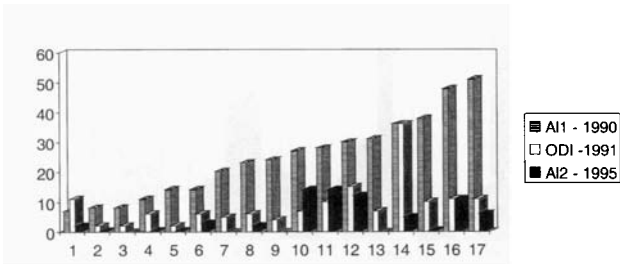


FIG. 5

Pre- and post-operative sleep registrations of patients with sleep apnoea. AI measured pre-op and five years post-op. ODI measured six months after operation.

the pharyngeal infection. Eight days after surgery, the stitches were removed.

Three months' check-up

Three months after surgery, a first questionnaire was completed and returned by the patient. If there were unusual complaints, a new visit was arranged. All patients, who had suffered from OSAS, underwent an oxymetry study six months after surgery. Depending on the result, additional treatment was undertaken if necessary (Hultcrantz *et al.*, 1991).

Five years' check-up

Five years after surgery, all patients were sent a questionnaire asking about their current general health as compared to before surgery. On a five-point scale, the patients rated their sleeping habits, their snoring situation, EDS, and any complaints ('side-effects') they might have had after surgery. They were asked to indicate how these complaints had changed during the five years. One of the most crucial questions was, 'Would you recommend this surgery to your friends and relatives who snore?' which gave the patient's weighed opinion about the value of the treatment he/she had undergone.

Five years after surgery, the patients who originally suffered from OSAS were offered another full polysomnography.

Seven years' check-up

After seven years, the patients who were operated on for heavy snoring were invited to another sleep study. Home-monitoring (EdenTrace II®, Nellcor Company, Eden Prairie, Minnesota) was used in these cases with thermistors, oxymetry, and registration of sleeping position, of electrical impedance (breathing load), and of snoring sounds.

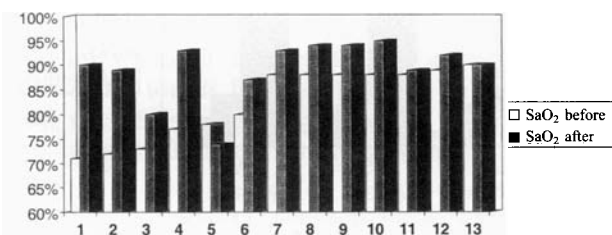


FIG. 6

Min SaO₂ before and five years after surgery.

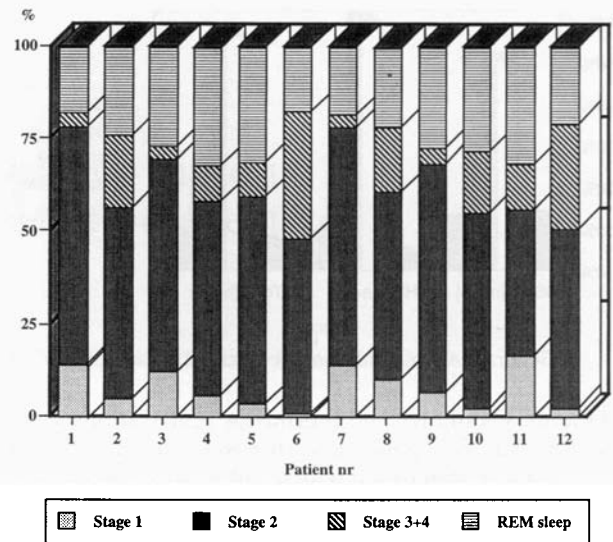


FIG. 7

Sleep pattern five years after surgery, based on polysomnography.

Results

No post-operative complications were noted, neither bleeding nor pulmonary problems. The patients reported that they felt the improvement of their breathing situation and snoring the first night after surgery. However, several reported severe delayed pain after three to five days, which had not been relieved sufficiently with the prescribed drugs.

Questionnaires

After three months, 100 per cent of the patients answered the questionnaire (Hultcrantz *et al.*, 1991). After five years, the response frequency was 90 per cent (48 patients): 18/19 with OSAS – one was deceased (at the age of 80 with pulmonary asbestosis), and 30/37 with HS – two were deceased, (one of hypernephroma and one of a heart attack). One had moved abroad. Three did not answer.

After three months, 80 per cent reported that their general health had improved considerably after surgery (Hultcrantz *et al.*, 1991), and no one reported that they felt as bad as, or worse than before. The results concerning the general health after five years are shown in Figure 1. Four patients reported on both occasions that they were perfectly all right.

With respect to snoring, 80 per cent reported after three months that they were much improved or had completely ceased snoring, while only one was snoring as much as before (Hultcrantz *et al.*, 1991). The results concerning snoring after five years are shown in Figure 2.

The effect on EDS after surgery showed the same tendency: Three months after surgery, only one reported unchanged somnolence; all the rest were much or slightly improved (Hultcrantz *et al.*, 1991). The results after five years are shown in Figure 3.

After five years, 36 out of 48 patients answered that they could recommend the treatment to friends and relatives (Figure 4).

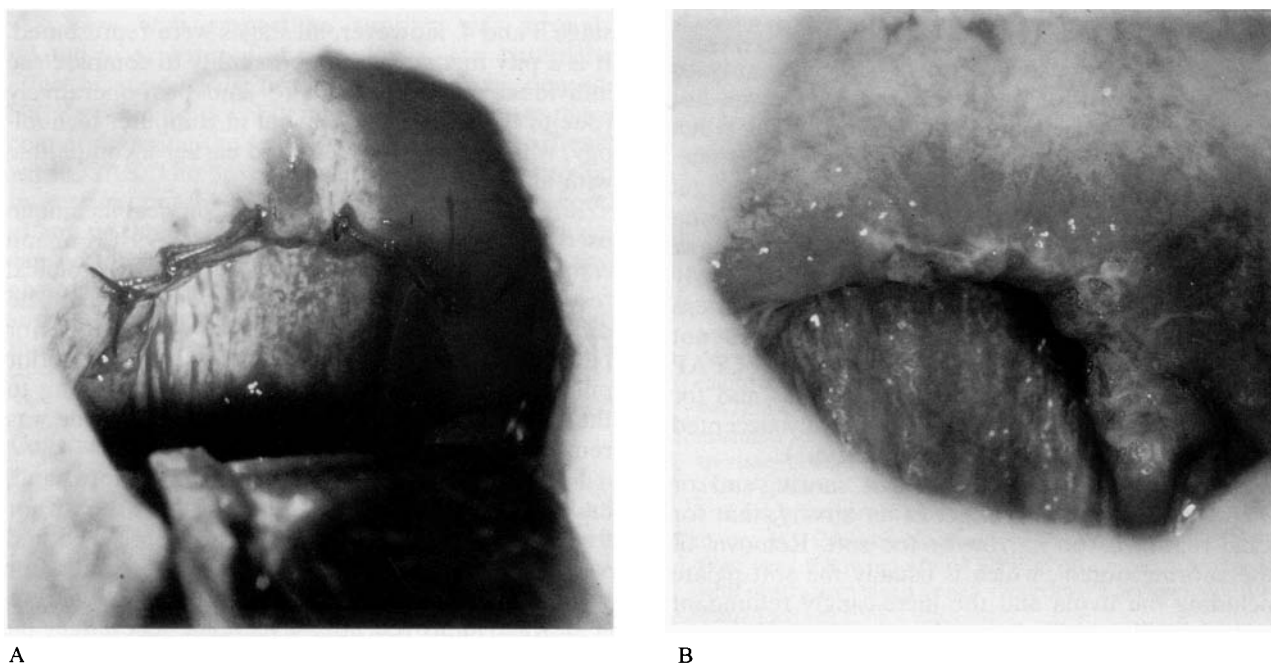


FIG. 8

a. Status at the end of surgery. b. The same patient two weeks later.

Sleep assessments

OSAS patients.

The results from the oxymetry study performed on 17/19 patients operated for OSAS six months after surgery are shown in Figure 5. Two patients refused to do the examination. Only three patients still had an Oxygen Desaturation Index (ODI) together with symptoms, which motivated further therapy (Figure 5. Patients number 12, 14 and 16). Of these patients, two received CPAP therapy and one was operated again with tonsillectomy and renewed plasty of the tonsillar pillars.

After five years, the results of the polysomnography from 13/19 OSAS patients are shown in Figure 5. (One dead, two refused and three never answered). Nine (50 per cent) could still be regarded as cured, with an AI ≤ 5 and the remaining four (30 per cent) as responders with >50 per cent reduction of the original AI.

The minimum oxygen saturation ($\text{SaO}_{2\text{min}}$) five years after surgery was significantly higher for all patients who had had pre-operative values below 90 per cent (Figure 6).

The assessment of sleep pattern based on polysomnography for 12/19 OSAS patients five years after surgery is demonstrated in Figure 7. (One patient got claustrophobia and could not pursue that part of the polysomnography).

HS patients.

The results of the sleep studies performed seven years after surgery on all of the 30 (out of 35) heavy snorers who had answered the questionnaire after five years indicated no development towards sleep apnoea: all had an AI and ODI between zero and three.

Side effects.

There were no differences with respect to side-effects between patients with OSAS or HS. Twenty-seven patients out of 48 operated, had defined one to three specific problems after LUPP:

- (1) Choking when eating, primarily during the first year was reported by nine patients. After five years, five patients still had some problems with a rating of 2 or 3 on a five-point scale where one meant no problems and five, serious problems.
- (2) Velopharyngeal insufficiency was reported by four patients after one year. After five years, only two still had this problem with a rating of 2.
- (3) Local problems from the throat such as pressure, pain, itching, thick mucus and/or a feeling of a lump in the throat were reported by nine patients. These problems had been rated 3 by eight patients and 4 by one after one year, slightly decreasing after five years.
- (4) Swallowing difficulties were reported by four patients. Their ratings were 3 after one year and 2 after five.
- (5) Increased vomiting reflexes (while brushing the teeth) was reported by two people who rated it 3 and 4 after one year. It was a problem which did not diminish with time.
- (6) Nasal problems, with congestion, rhinorrhoea, common colds, or sneezing were reported by six patients – all of them people who were operated on for heavy snoring. These problems remained unchanged over time, with a mean rating of 3 after five years.

Discussion

Although Ikematso described UPPP as early as 1952, the interest for this surgical technique was not generally recognized until the late seventies when Guilleminault defined the sleep apnoea syndrome. Since then, otorhinolaryngologists have operated on numerous patients all over the world with snoring and/or sleep apnoea – most often with the technique described by Fujita *et al.* (1981). During those early days, the patients who were the sickest were operated first and the effect of surgery was not always convincing. Over the years, the use of CPAP as treatment for more severe OSAS cases and for overweight people has become generally accepted (Gislason *et al.*, 1988a; Anand *et al.*, 1991).

In physical terms, the cause of snoring/and or OSAS is the Bernoulli effect in an airway, that for some reason is too narrow or too soft. Removal of 'the snoring organ', which is usually the soft palate including the uvula and the increasingly redundant posterior pillars, will almost always reduce the sound of snoring immediately. However, if the underlying cause of the snoring is not treated, the symptoms will return successively and the apnoeas may not disappear, or may reappear - a condition which has now been recognized by several studies (Janson *et al.*, 1994; Larsson *et al.*, 1994; Janson *et al.*, 1997). Since snoring and sleep apnoea affect a large proportion of the middle-aged population (Gislason *et al.*, 1988b; Lindberg, 1998), the pressure for treatment within the health care system has generated a need for less expensive means to treat these patients. LaUPP with, and LUPP without laser assistance are commonly used in out-patient settings and are thus less costly. But are these techniques as safe and effective as the more extensive surgery?

The present study is the first long-term follow-up of patients treated with a more restrictive kind of surgery, LUPP. The method was in this study absolutely safe with no peri-operative complications, probably because the patients were not influenced by any respiratory depressive drugs when they left the hospital. The effects of the surgery are good, both with respect to the patients' subjective satisfaction and with respect to objective measures. Eighty per cent would recommend the treatment to others after five years, 16/18 with OSAS and 22/30 'HS', which means that they had had largely positive experiences with the surgery and its consequences. None of the patients had the same or higher AI than before surgery and a higher proportion could be called 'cured' after five years than after six months. One patient, who still had an OSAS after six months with ODI of 35, received CPAP therapy (Figure 5 patient no. 14). After five years, this patient could return his CPAP machine following a 20-kg weight loss. At that time, he had an AI of five. This is in agreement with other studies where CPAP has been a prerequisite for a person to be able to lose weight (Schwartz *et al.*, 1991).

The assessment of sleep pattern five years after surgery gave varied results (Figure 7). Some of the patients still had very short periods of deep sleep in

stage 3 and 4. However, all stages were represented. It is a pity that we had no possibility to compare the individual patient's data pre- and post-operatively (due to the rapid development in computer technology, which made data collected earlier incompatible with later software).

It is important to stress that the surgical technique used in laser-assisted UPP (Carenfelt, 1991; Kamami *et al.*, 1997) does not yield the same anatomical results as the LUPP used in the present study. The difference is the plasty performed – the posterior pillars are pulled forward and sutured to the anterior pillars. That will create a lasting, wider opening to the epipharynx than if only the redundant tissue was removed (Figure 8a and b).

Four people reported that they did not snore at all, and were not at all tired either after three months or five years. Of the rest, about half of those who had said that their snoring was much improved after three months, instead reported that they were somewhat improved after five years. The effect on EDS seems to parallel these results. This is in accordance with other studies (Janson *et al.*, 1994; Larsson *et al.*, 1994; Janson *et al.*, 1997). However, it is difficult for a person to remember both how the snoring sounded and how they felt concerning sleepiness and tiredness five years earlier – especially since they are five years older. They had become accustomed to the new situation.

Even if the snoring sound should return successively over a longer period of time, the value of the surgery should not be underestimated: Snoring in combination with EDS is a medical hazard and a social problem mostly for middle-aged men (Gislason *et al.*, 1988b; Lindberg, 1998). After retirement when the stress-level is lower and there is more time for rest, the snoring and EDS seem to decrease (Lindberg, 1998). Helping the patients over the 'peak snoring years' can probably save marriages and also result in fewer traffic accidents (Haraldsson, 1991).

The good results from the present investigation are probably not only due to the surgical technique per se – the selection of patients is crucial. The same 80 per cent were satisfied with the surgery after three months and after five years. One of the two patients with OSAS who were not satisfied either after six months or five years was 68-years-old at the time of surgery. Although 'cured' according to the polysomnography (Figure 5, patient no. 12), he attributes multiple physical complaints probably due to ageing to the effects of the surgery. The other person with OSAS who was not satisfied at all, was a woman who was overweight, had fibromyalgia and depression, and could not tolerate the use of CPAP. Her depression deepened, her snoring did not improve, and she refused to go through another sleep examination, even though she answered both the questionnaires. Based on these severe cases as well as on the rest of the reported side-effects, we are now extremely careful to discuss all the possible disadvantages with surgery with the patient before the final decision about treatment is made.

Success with respect to snoring was strongly related to experience of side-effects: The better the effect on snoring, the fewer side-effects experienced. Nasal problems, possibly due to allergies, were more common among the 'HS's' than among the patients with OSAS. The nasal problems were not improved by surgery, but the effect on the snoring was as good as among the others. The nasal problems might have caused the increased Bernoulli effect originally and given rise to the snoring sounds. Treatment of a suspected allergy might have been of value to avoid those patients' 'side-effects' as well as to decrease the risk of relapse of snoring in the future.

Conclusion

LUPP without tonsillectomy has as good long-term positive effect on selected patients with OSAS as on patients with snoring and EDS ('HS'). Since the surgery is done under local anaesthesia, it is also usable for patients with cardiovascular risks. The surgery is safe and can most often be performed in an out-patient setting, which makes it very cost-effective.

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