

# Long term results of botulinum toxin type A (Dysport) in the treatment of hemifacial spasm: a report of 175 cases

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## Abstract

**Objective**—To describe the long term efficacy and side effects of the treatment of hemifacial spasm with Dysport and to evaluate two different sites of injection to hopefully reduce side effects.

**Methods**—This study was designed as a prospective descriptive study. Injections were made subcutaneously around the eye. Peak improvement was subjectively assessed by using a visual analogue scale and reported in percentages (0–100%). Duration of improvement was assessed subjectively and reported in months.

**Results**—Of 175 cases, 17 were lost to follow up and were excluded. 855 treatments were injected in the remaining 158 patients with a median of 4 treatments. The response rate was 97%. Of 855 treatments, the adjusted mean peak and duration of improvement was 77.2 (95% confidence interval (95%CI) 74.7–79.4)% and 3.4 (95%CI 3.2–3.6) months respectively. In 158 patients (complete group), the long term results from the first to the 12th treatment showed that the mean peak improvement ranged from 72.70 to 80.10% and the duration of improvement was 2.60 to 3.71 months. It remained constant throughout ( $p=0.40$ ,  $p=0.87$  respectively). The most common side effect was ptosis. Of the 158 patients, 21 completed 12 treatments (subgroup). A separate analysis of this group disclosed a mean peak and duration of improvement from the first to 12th treatments ranging from 70.00 to 78.10% and 2.65 to 4.31 months respectively. Analysis of variance with repeated measures showed no significant variation of peak and duration of improvement over the first to the 12th treatments ( $p=0.38$ ,  $p=0.38$  respectively). Only 3% of the treatments were unsuccessful but responded to subsequent treatments. The incidence of ptosis was reduced from 27.17% to 9.68% by moving the injection site to the lateral part of orbital orbicularis oculi without any loss of efficacy. The yearly cost of Dysport is considerably less than Botox.

**Conclusion**—This study is the first to show, in detail, the long term results of treatments of hemifacial spasm with Dysport. The efficacy is constant throughout the first to 12th treatments in both the complete group and subgroup. Ptosis can be reduced by moving the injection site further up to the lateral part of the orbital

**orbicularis oculi. The efficacy of Dysport is comparable with Botox® in long term follow up.**

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**Keywords:** Botulinum toxin type A; Dysport; hemifacial spasm; long term treatment

Hemifacial spasm is characterised by unilateral intermittent clonic or tonic contractions of the muscles of facial expression supplied by the facial nerve. The most likely cause is due to microvascular compression at the root exit zone.<sup>1</sup> It is usually a chronic, progressive disease. Although it is not a life threatening condition, it may cause patients unremitting social handicap.<sup>2</sup> It may be treated by microsurgery at the brain stem with an 80%–90% success rate.<sup>3</sup> Surgery carries a recurrence rate of up to 25% over the next two years,<sup>4</sup> and some patients may have complications.<sup>5</sup> Many patients refuse surgery because it is a major procedure and has potentially serious side effects. Recent studies show that botulinum toxin is a very effective alternative to surgery in the treatment of hemifacial spasm.<sup>6</sup>

Botulinum toxin type A is a neurotoxin produced by *Clostridium botulinum* bacteria. The action is to paralyse the injected muscles by irreversible blockage of the cholinergic transmission at the presynaptic nerve terminals.<sup>7</sup> It has been approved for use in the treatment of various movement disorders which are associated with excessive muscle contraction. These disorders are cervical dystonia, limb dystonia, blepharospasm, and hemifacial spasm.<sup>6</sup> There are two major sources of botulinum toxin type A. One is Botox® (Allergan, USA), and the other is Dysport (Porton Products Limited, UK). Botox is a lyophilised form, purified from the culture solution by a series of acid preparations to a crystalline complex. Dysport is redissolved and purified by a series of procedures involving ammonium sulphate precipitation and ion exchange chromatography, and then freeze dried. The two preparations of botulinum toxin are different in terms of unit of weight, chemical properties, biological activities, and mouse LD50 units.<sup>8</sup> For these reasons, it may be that the clinical efficacy of these two preparations could be different.

Clinical trials of Dysport in hemifacial spasm have received little attention, with only five articles reported in the English medical literature.<sup>2-11</sup> There has been only one report on the long term efficacy of Dysport, by Elston in 1992, in which he described very little about

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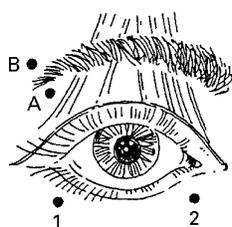


Figure 1 Sites of injection: for the lower eye lid, injections are made into sites 1 and 2, for the upper eye lid, injections are made into sites A or B.

the results of Dysport in hemifacial spasm. Questions remain about the long term efficacy of Dysport, and the benefit when compared with Botox. We, therefore report in detail a study of our long term experience in the treatment of 175 patients with hemifacial spasm with Dysport during a seven year period. This is the first report of the long term results from a non-European country.

The objectives of this study were: (1) to describe the long term efficacy (the response rate, peak, and duration of improvement and incidence of unsuccessful treatments); (2) to describe the side effects (incidence, type, and duration); (3) to evaluate two sites of injection to hopefully reduce the side effects; (4) to compare efficacy and the cost of treatment between Dysport and Botox.

## Materials and methods

### PATIENTS AND SETTINGS

A total of 175 consecutive cases of hemifacial spasm were diagnosed and treated with botulinum toxin type A (Dysport) between September 1989 and September 1996 in a teaching hospital in Thailand. The longest follow up period was seven years and the shortest was three months. All patients underwent a complete history taking and physical examination to rule out the secondary causes of hemifacial spasm. The study was designed as a prospective descriptive study.

### BOTULINUM TOXIN

We used botulinum toxin type A, supplied by Porton Products Limited, UK. It is supplied as a white freeze dried pellet containing 500 units *C botulinum* type A toxin-haemagglutinin complex. We used 2.5 ml normal sodium chloride mixed gently with the toxin. The solution contained 200 units/ml Dysport.

### METHOD OF INJECTION

To treat hemifacial spasm, all patients were injected subcutaneously into the medial and lateral part of the lower eye lid (sites 1, 2) (fig 1) with a 27 gauge insulin syringe. For the

upper eye lid injection, before 1994 we injected into the lateral part of the junction of the orbital and preseptal orbicularis oculi, just below the lateral eyebrow and orbital part of the upper eyelid (site A). After 1994, the injection site was moved to the lateral part of the orbital orbicularis oculi, just above the lateral eyebrow (site B). Over the seven year period, injection sites were modified in only a few treatments depending on residual spasm and side effects. Most of the treatments were injected with the same regimen. The orbicularis oris was injected if there were residual contractions of the mouth after the orbicularis oculi injection. The dose ranged from 28–220 units for one treatment session depending on sites and severity of spasm. Reinjection was performed when the spasm resumed and if patients thought that it was severe enough to request another treatment.<sup>12–14</sup> The dose of botulinum toxin was gradually reduced during 1988–91 for economic reasons. The price of botulinum toxin increased markedly during that period.

### ASSESSMENTS

After each treatment, we assessed the patients to determine peak improvement, duration of improvement, and side effects. Peak improvement was subjectively assessed by using the visual analogue scale and reported in percentages (0–100%). We considered the treatment unsuccessful if peak improvement was <20%. Duration of improvement was also measured in months as assessed by patients. We defined the duration of improvement as the time between treatment and the recurrence of symptoms which were severe enough to prompt patients to come for another injection. Side effects were also looked for and recorded. At the beginning of the trial, we asked patients to come for a follow up every month for three months. After that, the patients came back only when they needed another treatment.

### LITERATURE REVIEW

We searched in CD ROM Medline for all articles on clinical trials of botulinum toxin from 1966 to 1996. We reviewed only articles published in English.

### ANALYSIS OF TREATMENTS

We analysed the patients first as a complete group (158 patients), and then secondly, considered separately those who had completed the 12 treatments, as a subgroup (21 patients). We analysed peak improvement and duration of improvement for each of the first 12 treatments in both the complete group and the subgroup. We selected only the first 12 treatments because the number of patients with more than 12 treatments was too small.

### STATISTICAL ANALYSIS

We used descriptive statistics to describe peak and duration of improvement in the series of treatments. Ninety five per cent confidence intervals (95% CIs) of the mean were used to measure the precision of peak improvement and duration of improvement of the patients

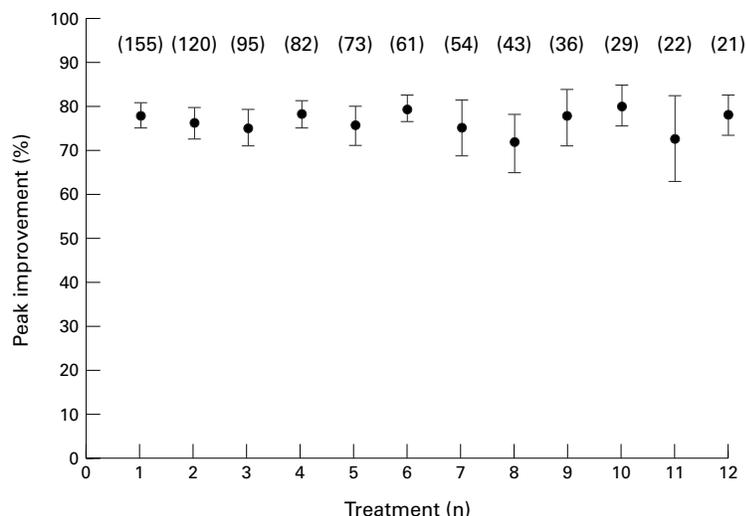


Figure 2 Mean (95% CI) of peak improvement for the first to 12th treatments of the complete group (158 patients).

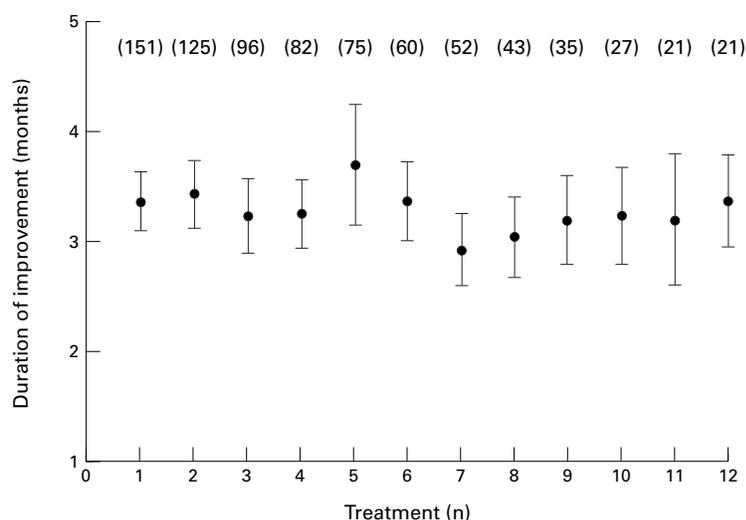


Figure 3 Mean (95% CI) of duration of improvement for the first 12 hours of treatment of the complete group (158 patients).

for each treatment. The estimation took into account clustering—that is, repeated measures on the same patient. The differences in peak improvement and duration of improvement in the subgroup of patients (n=21) were tested by analysis of variance (ANOVA) with repeated measures at the 5% significance level. For the complete group of patients (n=158), we applied the K (GEE)<sup>15</sup> for estimating effects of treatment over a series of observations made on the same patients. For the GEE approach, the link function was identity with a Gaussian family. The structure of within group correlation was investigated through fitting the correlation structure as unstructured. As the correlation matrix showed little pattern, it was specified to be exchangeable. Several attempts were also made on modelling the two outcomes separately, to determine the effect of the number of treatments. The most appropriate model which provided robust results was chosen. Prevalence of ptosis was analysed by comparing the injections made at the lateral part of the junction of the orbital and preseptal orbicularis oculi (site A) with the injections

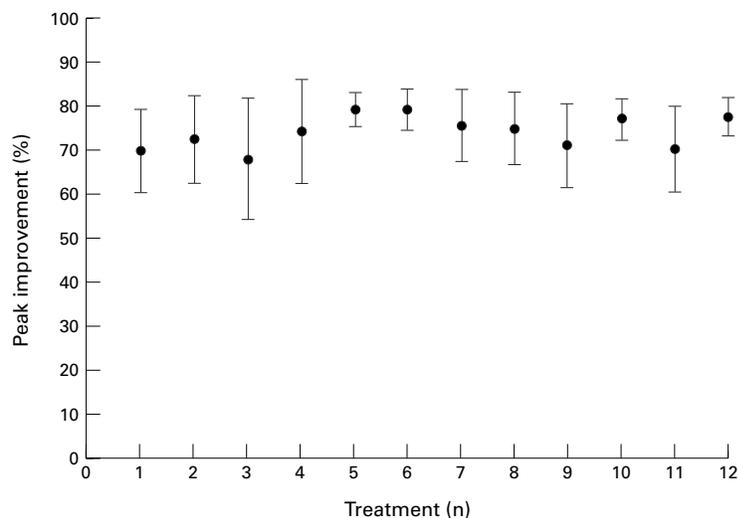


Figure 4 Mean (95% CI) of peak improvement of the subgroup of 21 patients who had completed 12 treatments.

made at the lateral part of the orbital orbicularis oculi (site B). The  $\chi^2$  test was applied to test the differences between the two groups with a 0.05 significance level.

**Results**

**OVERALL TREATMENTS: RESULTS OF 855 TREATMENTS IN 158 PATIENTS**

During the seven year period, we treated 175 consecutive patients with hemifacial spasm with botulinum toxin type A (Dysport). From these, 17 patients (9.7%) were excluded due to being lost to follow up after the first treatment. Of 883 treatments, 28 (3.1%) were excluded because the data were incomplete. A total of 855 treatments were analysed in 158 patients with a median of four (range 1–19) treatments for each patient. The mean age was 49.10 (SD 11.39) years. Of the 158 patients with hemifacial spasm, 81 were on the right side and 77 were on the left side. The median duration of the symptoms before treatment was 4.00 years with a range of 0.25 to 25 years. There were 118 female and 40 male patients. The mean follow up period was 2.39 years (SD=1.71, range 3–80 months). The mean dose of botulinum toxin (Dysport) for each treatment was 92 (SD 29.4) units with a range of 28–220 units.

*Successful treatments*

Nearly all treatments were effective, with a response rate of 97.0%. The adjusted mean peak of improvement was 77.2 (95% CI 74.7–79.4) with a range of 0%–100%. Of all treatments, 597 (70%) were rated as 75%–100% improvement. The adjusted duration of improvement was 3.4 (95% CI 3.2–3.6) months with a range of 0–18 months. There were 26 treatments (3.0%) considered unsuccessful with a peak improvement <20%.

*Unsuccessful treatments*

We analysed 26 treatments from 23 patients (15% of all patients) which were considered unsuccessful. Three were primary failures and 23 were secondary failures. The failures occurred sporadically. Of these, five patients were lost to follow up after the unsuccessful treatments for unknown reasons. Twelve patients were injected with the same dose at the subsequent treatments. All of them responded well (mean peak of improvement 68.75%, mean duration of improvement 2.5 months). Six patients were injected with an increased dose of botulinum toxin with a good response (mean peak improvement 62.14%, mean duration of improvement 3.0 months).

**RESULTS OF LONG TERM TREATMENTS IN THE COMPLETE GROUP OF 158 PATIENTS**

Figures 2 and 3 show the results of the first to 12th treatments and their 95% CIs for the complete group of 158 patients. The mean peak of improvement ranged from 72.07% to 80.17%, and the duration of improvement ranged from 2.93 to 3.71 months. There was no significant difference over the series of the first to 12th treatments in both the peak improvement (p=0.40) and the duration of

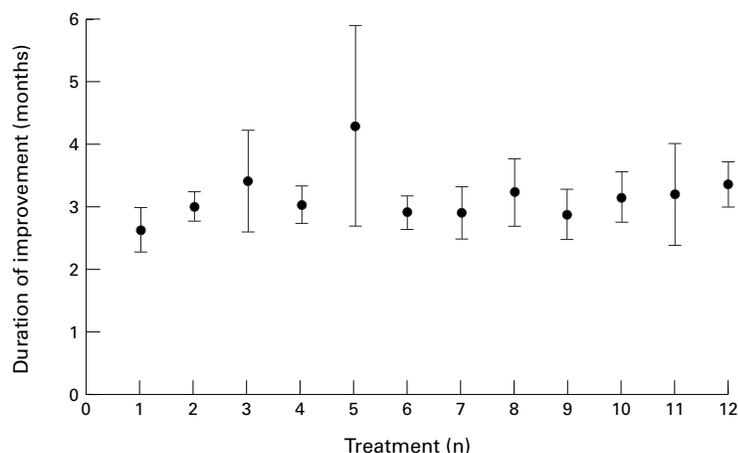


Figure 5 Mean (95% CI) of duration of improvement of the subgroup of 21 patients who had completed 12 treatments.

improvement ( $p=0.87$ ). These were adjusted for clustering by using the GEE. The efficacy throughout 12 treatments was comparable.

#### RESULTS OF LONG TERM TREATMENT IN THE SUBGROUP OF 21 PATIENTS WHO HAD COMPLETED 12 TREATMENTS

We analysed the results of treatment in 21 patients who had completed 12 injections. Figures 4 and 5 show the mean peak of improvement and mean duration of improvement in these patients. Mean peak improvement ranged from 70.00% to 78.10%. Duration of improvement ranged from 2.65 to 4.31 months. Analysis of variance (ANOVA) with repeated measures showed no significant variation of peak ( $p=0.38$ ) and duration of improvement ( $p=0.38$ ) among treatments within individual patients. The mean dose of Dysport used was gradually decreased from the initial 130 units to 84 units for the sixth treatment. After the seventh treatment, the dose levelled off and remained constant throughout. There was a 35% reduction in the dosage.

#### SIDE EFFECTS

Side effects were noted in 29.1% of all treatments. The most common was ptosis, which occurred in 189 treatments (22.10%), followed by drooping of the mouth (8.38%). Both side effects may occur after the same treatment. In most cases, ptosis was transient and disappeared within one to four weeks with a mean of 2.64 weeks.

Since 1994, to reduce ptosis we modified the site of the injection from the lateral part of the junction of the orbital and preseptal orbicularis oculi (site A) to the lateral part of the orbital orbicularis oculi (site B). Prevalence of ptosis from the injections to the lateral part of the

junction of the orbital and preseptal orbicularis oculi (group A) was 138 out of 508 treatments (27.17%, table 1). In the injections to the lateral part of the orbital orbicularis oculi (group B), ptosis occurred in 21 out of 217 treatments (9.67%). The mean peak improvement of group A and B were 77.76 (95%CI 75.74–79.78)% and 74.93 (95%CI 71.44–78.42)% respectively. The durations of improvement of group A and group B were 3.39 (95%CI 3.19–3.54)months and 3.33 (95%CI 3.09–3.57)months respectively. We found that prevalence of ptosis in group B was significantly less than that of group A ( $p<0.001$ ). There was no difference between the two groups in peak improvement and duration of improvement ( $p=0.770$ ,  $p=0.063$  respectively). The average dose used in both groups was also comparable ( $p=0.247$ ). The second most common side effect was drooping of the mouth.

#### Discussion

In this report, we describe in detail the results of 855 treatments with Dysport in 158 patients with hemifacial spasm. The study was conducted during a seven year period in a teaching hospital in Thailand. Only 9.7% of patients were lost to follow up. To the best of our knowledge, it is the largest follow up series in botulinum toxin treatment (Both Botox and Dysport) of hemifacial spasm reported to date.

#### TREATMENT OF HEMIFACIAL SPASM WITH DYSPORT

##### Overall treatments

Elston was the first to report the use of Dysport in hemifacial spasm, in 1986.<sup>2</sup> Since then, there have been four clinical trials reported in the English medical literature (table 2).<sup>8–11</sup> Only two reports had more than 30 patients.<sup>8,11</sup> A total number of 156 patients have been reported. Overall response to treatments was very good. The response rate ranged from 75% to 100%. The duration of benefit ranged from 2.52 to 4.92 months. Most of the benefit lasted between 2.80 to 3.57 months. The largest study was by Elston in 1992.<sup>11</sup> He reported 73 patients in a seven year period, but his paper provided little detail on the results of long term treatment.

Our studies on patients with hemifacial spasm showed a 97.0% response rate and an overall mean duration of improvement of 3.4 months. This is comparable with all of the reported series. The degree of improvement was excellent with a mean peak improvement of 77.20%. In 70% of treatments the degree of improvement was judged to be 75% to 100%. Bergh *et al* found that the mean peak improvement was 90% and the mean duration of

Table 1 Prevalence of ptosis related to a different site of injection on the upper eyelid

	Treatments (n)	With ptosis (n)	Ptosis % (95% CI)	Peak improvement % (95% CI)	Duration of improvement months (95% CI)	Upper eyelid dose mean (95% CI)
Group A	508	138	27.17 (22.18–32.79)	77.76 (75.74–79.78)	3.39 (3.19–3.54)	19.35 (18.89–19.77)
Group B	217	21	9.67 (6.13–15.35)	74.93 (71.44–78.42)	3.33 (3.09–3.57)	19.77 (19.18–20.35)
p Value			<0.001	0.770	0.063	0.247

Group A = injection was made into the junction of the orbital and preseptal orbicularis oculi (site A).

Group B = injection was made into the lateral part of orbital orbicularis oculi (site B).

Table 2 Short term and long term published treatment results of Dysport and long term published treatment results of Botox in hemifacial spasm

Type of botulinum toxin	Authors	Type of study	Follow up (y)	Patients (n)	Stopped treatment (n)	Treatments (n)	NC	NC (n)	Mean dose (units)	Response rate (%)	PI	DI (months)	Long term results	Side effects (%)
Botos	Dutton <i>et al</i> <sup>26</sup>	Long term	4	60	—	148	—	—	—	96.8	—	3.60	—	23
	Taylor <i>et al</i> <sup>27</sup>	Long term	—	130	—	336	12	7	—	98	—	4.23	Sustained	32
	Flanders <i>et al</i> <sup>28</sup>	Long term	8	65	14	—	12	9	34	100	—	4.06	Sustained	8
Dysport	Elston <sup>2</sup>	Short term	—	6	—	—	—	—	60	100	—	3.57	—	—
	Chong <i>et al</i> <sup>9</sup>	Short term	—	25	—	—	—	—	—	100	—	—	—	40
	Yu <i>et al</i> <sup>10</sup>	Short term	—	12	—	76	—	—	148.8†	94.7	—	2.52	—	92
	Elston <sup>*11</sup>	Long term	7	73	—	—	—	—	120–160	75	—	2.80–	—	19–33
	Bergh <i>et al</i> <sup>8</sup>	Long term	5	40	12	144	—	—	53	100	90	3.50 4.93	—	22
Jitpimolmard <i>et al</i> this paper	Long term	7	175	17	883	21	21	92	97	77.2	3.4	Sustained	29	

PI=peak improvement, NC=number of patients in subgroup who had completed certain number of treatments; NC (n)=number of treatments which subgroup of patients has completed; DI=duration of improvement; —=not available.

\*42 of 73 patients have been reported in 1988 and all 73 patients have been reported in 1990.

†In the original report the dose was too low, we performed a new calculation based on weight of toxin; 1 month=4.28 weeks.

improvement was 4.93 months. These results seem better than ours. In the series of Bergh *et al* 12 out of 40 cases (30%) stopped further treatment. In our study, however, only 9.7% were lost to follow up. The sample size in the series of Bergh *et al* was small, which may have caused a selection bias toward marked improvement. Patients who continued treatment possibly were those who were obtaining a good result. Our report showed that overall treatments with Dysport were also effective and comparable with other reports.<sup>9–11</sup>

#### Long term results

Elston reported 73 patients with hemifacial spasm; however, few data on hemifacial spasm were provided<sup>11</sup>; he described mainly blepharospasm. Bergh *et al* reported in 1995 on 40 patients with hemifacial spasm that were treated with Dysport. Neither group of authors mentioned the long term results in detail; nor was there data on peak improvement or the duration benefit of serial treatments. Our study showed clearly that Dysport was effective in serial treatments. It showed that the efficacy of both peak and duration of improvement remained unchanged with repeated injections. It is worth noting that whereas the dose was gradually reduced by about 35%, the benefits, including peak and duration of improvement were constant throughout all treatments. The reason for this may be the lessening severity of the disease during the later treatments. Patients usually came for reinjection before the symptoms became as severe as before treatment, thus possibly requiring less toxin. We do not know how continuing the same dose during later treatments would effect the results of the study.

#### Unsuccessful treatments

Of the 855 treatments, 26 were considered unsuccessful. Most of them responded to subsequent treatments with the same dose or a slightly increased dose. They occurred sporadically in patients who responded quite well in previous or later treatments. We concluded that unresponsive treatments were only transient. The ineffective treatments neither related to any batch of botulinum toxin, nor clustered at the same time. The reason for unresponsiveness was unclear. Variation in injection technique may account for this. It may have been

caused by a slight variation in site, or depth of injection, or it may be that unsuccessful injections were away from the motor endplate.<sup>16</sup> We would suggest the same dose be continued, even if the previous treatments were ineffective.

#### Side effects

We noted that Dysport administration was well tolerated. Ptosis is the most frequent side effect of botulinum toxin injections. Elston reported in 1992 that in patients who were injected into the lateral part of the junction of the orbital and preseptal orbicularis oculi (group A, site A), the average duration of benefit was 3.5 months, and 33% had side effects. In his patients who were injected into the lateral part of the orbital orbicularis oculi (group B, site B), the average duration of benefit was 2.8 months with 19% having side effects. In Elston's series, modification of injections in the later group reduced side effects by 50% but seemed to shorten the duration of improvement. The explanation for the shorter duration was not given.

In our study, we have also shown that ptosis was significantly reduced by moving the injection site from the lateral part of the junction of the orbital and preseptal orbicularis oculi (site A) to the lateral part of the orbital orbicularis oculi (site B, fig 1). Prevalence of ptosis was reduced from 27.17% to 9.67%. A possible explanation for this may relate to local diffusion of the botulinum toxin across the orbicularis oculi to the levator muscle. Although the distance from site B to the levator muscle is slightly shorter than the distance from site A, there are more anatomical barriers—for example, the lacrimal gland, orbital septum, and orbital fat that the toxin has to travel through before it reaches the levator muscle. Conversely, the toxin from site A has direct access to the levator muscle by diffusion through the thin pretarsal orbicularis oculi. In our study, the mean peak improvement, duration of improvement, and dosage of Dysport were the same in both groups (table 1). Thus, modification of the injection site in our series did not shorten the duration of improvement as it did in the Elston series.

The optimal injection site of botulinum toxin is controversial. Many investigators have advocated injection of the lid margin rather than the preseptal part of the upper eyelid, which resulted

in a reduction of ptosis.<sup>17-19</sup> In our study, however, the injection into the lateral part of the orbital orbicularis oculi also reduced the prevalence of ptosis without compromising the efficacy of the treatments. The limitation of this study is that it was not controlled. There might be a measurement bias. We knew the site of the injections. As ptosis is a hard outcome, we thought that there possibly was a bias though not substantial. To our knowledge, no study has been undertaken to find out the optimal sites of injections with the least side effects. A controlled study is needed to elucidate this issue. The second most common side effect is mouth drooping. It usually is associated with injection to the orbicularis oris. Therefore, injection of the orbicularis oris should be avoided as it is often associated with a mouth droop.

#### LONG TERM TREATMENT OF HEMIFACIAL SPASM WITH BOTOX

The short term results of treatment with Botox have been reported by several authors.<sup>20-25</sup> There have been three reports on long term treatments with Botox (table 2).<sup>26-28</sup> In all three series, the total number of patients, total treatment sessions, and the number of patients who had completed treatments were smaller than ours. In two studies,<sup>27,28</sup> each having 12 patients with completed treatments, it was shown that the long term results of the duration of improvement were sustained for seven to nine treatments. Neither of these groups of authors reported the degree of improvement nor followed up their patients through as many treatments as we did.

Comparing the results of treatments between Botox and Dysport may be difficult. Many factors are different—for example, injection sites, dose, population, and assessment. In our series, response rate and peak improvement were comparable with Botox but the duration of improvement seemed to be shorter than in the Botox series.<sup>27,28</sup> The explanation for this might be the difference in injection sites. Aramideh *et al*<sup>18</sup> have shown in blepharospasm that additional pretarsal injections resulted in a longer duration of improvement (12.5 weeks) when compared with orbital and preseptal injections (8.5 weeks). The reason may be that the pretarsal portion is mainly composed of type I muscle fibre, which recovers faster from botulinum toxin injection.<sup>18</sup> In our study, we did not inject into the pretarsal orbicularis oculi. By contrast, both Taylor *et al*<sup>27</sup> and Flanders *et al*<sup>28</sup> injected Botox into the pretarsal orbicularis oculi. A controlled study is needed to clarify this matter. Our results of the long term treatments, in both the complete group and subgroup analysis, showed that both peak and duration of improvement were constant. This is similar to reports on Botox.<sup>27,28</sup>

For the estimated yearly cost of treatment, in our series the mean dose of Dysport used was 92 units and the mean duration was 3.4 months. Flanders *et al* were the only authors who reported the average dose of Botox used, which was 34 units and the duration of benefit was 4.06 months. For Botox, in one year, a

patient needs  $12/4.06=2.96$  treatments and the total amount of toxin used is  $34 \times 2.96=100.49$  units. The estimated cost is £135.67 (Botox 100 unit=£135, NHS price list, UK) per year. For Dysport, a patient needs  $12/3.4=3.53$  treatments and the total amount of toxin used is  $92 \times 3.53=324.71$  units. The estimated cost is £112.02 (Dysport 500 unit=£172.5, NHS price list, UK) per year. The yearly cost of Dysport is significantly less (17.43%) than Botox, although the patients need to come for injections slightly more often. We conclude that the estimated yearly cost of treatment of hemifacial spasm with Dysport is less than Botox.

#### Conclusions

This is the only detailed report of long term treatment with Dysport. We confirm that long term treatment of hemifacial spasm with Dysport is highly effective and safe. The efficacy in both peak and duration of improvement are maintained throughout 12 treatments, which are comparable with the previous reports on Botox. Duration of benefit seems to be shorter than that of Botox, which may be explained by the difference in sites of injection. Ptosis was reduced by moving the injection site further up to the lateral part of the orbital orbicularis oculi without compromising the efficacy of treatments. From the analysis of the outcome of treatments, Dysport can be used as effectively as Botox and the yearly cost is less.

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