SEASONAL PREVALENCE OF MORAXELLA
PREVALÊNCIA SAZONAL DA MORAXELLA *

O.P. van Bijsterveld, Galba Volpini and A. T. Quik. **

At the turn of the century, angular conjunctivitis caused by Moraxella was found by a number of investigators to have the highest incidence of all types of conjunctivitis [1-3]. Some researchers felt that there was a definite prevalence for infection in spring and summer [3-5].

Moraxella was also reported a common member of the normal conjunctiva [6,7] but the seasonal prevalence was not studied.

Recently, however, Moraxella have been rarely isolated from the inflamed conjunctiva [8,9] and the incidence of these organisms on the normal conjunctiva is so low [10-12] that nothing could be said from the seasonal prevalence.

Moraxella can be isolated frequently from the upper respiratory tract [13,14] nothing is known about the seasonal prevalence of Moraxella in this area; therefore this was studied. Also, the incidence of Moraxella on the inflamed and normal conjunctiva was reinvestigated an the seasonal prevalence of Moraxella conjunctivitis compared with that of the upper respiratory tract isolations.

Methods.

A total of 376 swabs from various inflammatory conditions of the outer eye and 301 swabs from the normal conjunctiva and the lidmargins as well as 1116 swabs from the upper respiratory tract of a group of adults and a group of children were examined. Identification of 100 randomly selected Moraxella isolates from the upper respiratory tract and all the eye isolates were done accordingly to previously described techniques. The remaining isolates were determined at the level of the genus.

Results.

The number of isolates from the eye and the concomitant isolates from the nose, grouped into categories of blepharoconjunctivitis, angular con-

* Koninklijk Nederlands Gasthuis voor Ooglijders, — Hospital Real dos Olhos da Univ. de Utrecht, Holanda F.C. Dondersstraat 65, Utrecht.

** Reprints requests to: O.P. van Bijsterveld M.D. Ph.D., Koninklijk Nederlands Gasthuis voor Ooglijders, F.C. Dondersstraat 65, Utrecht, Holland or Galba Volpini Clinica Oftalmológica Armando Gallo - Rua Conselheiro Brotero, 1505 - São Paulo, SP.

junctivitis and keratoconjunctivitis as well as the control group are shown in table I.

Table 1 — Number of Moraxella isolated from the external eye and antrum nasi

Clinical type of infection	Total N.o Patients	Moraxella isolates from the eye N.°	%	Moraxella isolates from the nose N.°	%
Blepharoconjunctivitis	236	1	0.4	36	15.3
Angular conjunctivitia	64	2	3.1	6	9.4
Keratoconjunctivitis	76	0	0	14	18.4
Control	301	1	0.3	39	12.9

From the group of blepharoconjunctivitis Moraxella was isolated in one patient from both eyes but not from the nose. From the group of angular conjunctivitis 2 cases were associated with Moraxella. In both patients the same species was also recovered from the nose. From the group of keratoconjunctivitis no Moraxella was isolated. From a single subject amoung 301 controls Moraxella was isolated from the eye as well as from the nose. The overall incidence of Moraxella isolates of the inflamed and normal structure of the eye is low: 0.8 and 0.3% respectively. But from the nose Moraxella were often isolated. In the first group in 15,3 per cent of the cultures Moraxella was isolated.

In the angular conjunctivitis group this percentage was 9.4 In the group of the keratoconjunctivitis Moraxella were recovered in 18.4 per cent and in the controlgroup in 12.9 per cent. Although the percentages seem to differ considerably between the groups, statistically they were not significantly different.

In 670 noseswabs of persons of 14 years or younger Moraxella was isolated 110 times (16.4%) from the nose and in 446 adults these microorganisms were recovered 84 times (18.8%). Statistically there was no difference in the number of isolations between these age groups.

The percentages of Moraxella isolated per month with regard to the total number of Moraxella isolated per year from the upper respiratory tract in children and in adults is shown in table 2. Moraxella prevails in the nasal cavity in winter and in spring with a peak in april for both age categories. Very few Moraxellae were isolated in summer and early fall, but from november, the number of isolations increased gradually.

Table 2 — Percentage of Moraxella isolated per month with regard to the total number of Moraxella isolated per year from the upper respiratory tract in children and adults

Month	percentage	
	children	adults
January	11.0	7.1
February	20.0	15.5
March	17.3	14.3
April	24.6	17.9
May	11.8	10.7
June	5.5	13.1
July	5.5	0
August	2.7	2.4
September	0.9	3.6
October	0	3.6
November	0	3.6
December	0.9	8.3

M. nonliquefaciens was identified in 91 out of 100 randomly selected upper respiratory tract strains. Six Moraxella strains were identified as **M. lacunata** and three as **M. liquefaciens.**

Analysis of the incidence of Moraxella conjunctivitis in the past is interesting. Geis studied the number of conjunctivitis per month over a four year period and reported that the incidence was highest in the summer months. Analysis of his data indicate, however, that a significant increase in the average number of Moraxella conjunctivitis over this four year period was found (figure 1) but that the average number of conjunctivitis per month did not differ significantly (figure 2). This suggests that over the four year period the detection of Moraxella conjunctivitis improved significantly.

In figure 3 the frequency polygons of the average number of Moraxella conjunctivitis reported by Geis averaged over four years and the frequency polygon of the upper respiratory of the polygons. Also there is a considerable dissimilarity between the frequency polygon of the average number of Moraxella conjunctivitis per month of the last year, which has the highest number of Moraxella conjunctivitis and the frequency polygon of the upper respiratory tract isolations.

Analysis of the data of Usher and Frazer also shows that there was not a significant seasonal prevalence of Moraxella conjunctivitis. Only the data of Schmidt show a statistically significant difference in number of Moraxella conjunctivitis cases between the various months. The peak of the number of conjunctivitis cases was seen in the months may and june.

In figure 4 the frequency polygon of Moraxella conjunctivitis and the isolation frequency of the upper respiratory tract are superimposed.

Although there is some similarity in the relative frequencies, statistically these distributions are very significantly different.

Comment.

Lundsgaard in 1900 estimated 35 per cent of all conjunctivitis cases due to Moraxella. Pollock in 1905 found that Moraxella infection constitued 17 per cent of his conjunctivitis cases and Geis in 1907 found that Moraxella conjunctivitis constituted 58 per cent of all conjunctivitis cases. So, according to these authors, Moraxella conjunctivitis represented a considerable proportion of all conjunctivitis cases.

Recently, however, Jones and associates found Moraxella only responsible for conjunctivitis in one out of 855 cases, in 1963 Thygeson and Kimura isolated these bacteria in 7 out of 907 cases of chronic conjunctivitis.

We isolated Moraxella in 3 out of 300 cases of chronic conjunctivitis.

So the incidence has dropped remarkably. Likewise, in the past Moraxella were frequently isolated from the normal conjunctiva by Pillat and von Pelláthy but the seasonal prevalence of Moraxella on the normal conjunctiva was not studied. Recently, however, these organisms are rarely found on the normal eyelid margins and in the conjunctival sac.

As there is a definite seasonal prevalence for Moraxella in the upper respiratory tract passages it is of some interest to compare if there is a parallel in the relative frequencies of conjunctivitis cases and the upper respiratory tract isolations per month. As the incidence of Moraxella conjunctivitis cases presently is low comparisons were made with the data of Geis and Schmidt. Analysis of the data of Geis suggests that the clinical ability to diagnose the classical Moraxella infections improved over the four years period, but contrary to his impression that the conjunctivitis incidence is highest in the summer months, there was in fact no such prevalence. Schmidt's data show a statistical significant increase in may and june but a clear cut parallel with the relative frequencies of the isolations of the upper respiratory tract was not found.

Summary and conclusions

Around the turn of the century Moraxella conjunctivitis was frequently encountered. Presently these types of conjunctivitis was met with less frequency. Also, in the past Moraxella were often found on the normal conjunctiva, but recently these organisms are only rarely found on the healthy conjunctival membranes.

Some authors in the past felt that there was a definite seasonal prevalence of Moraxella conjunctivitis. Only the data of Schmidt, however, showed a statistically significant peak of angular conjunctivitis in springtime and early summer.

Recently Moraxella are frequently found in the upper respiratory tract.

We found a definite seasonal prevalence in the number of our isolations.

The peak incidence was in april. Although the incidence of conjunctivitis cases studied by Schmidt had its peak in may, there was no close parallel between the relative frequencies of conjunctivitis cases and the upper respiratory tract isolations.

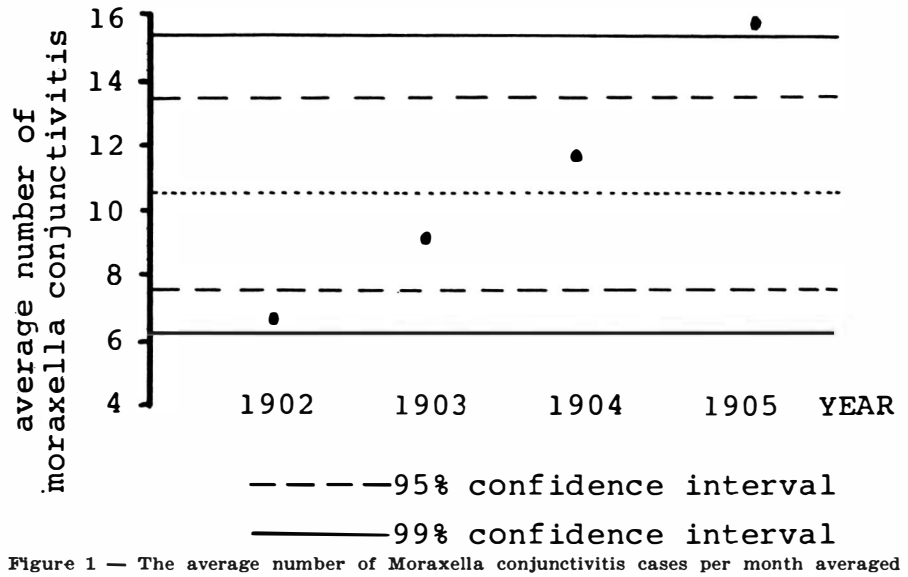

Figure 1 — The average number of Moraxella conjunctivitis cases per month averaged over 12 months in four consecutive years. (date of Geis).

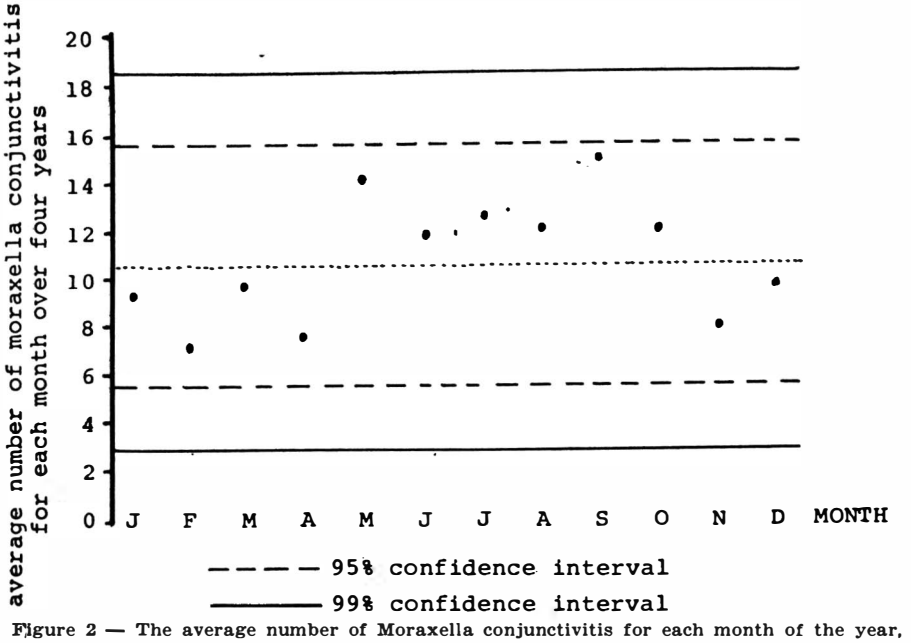

Figure 2 — The average number of Moraxella conjunctivitis for each month of the year, averaged over four years. (data of Geis).

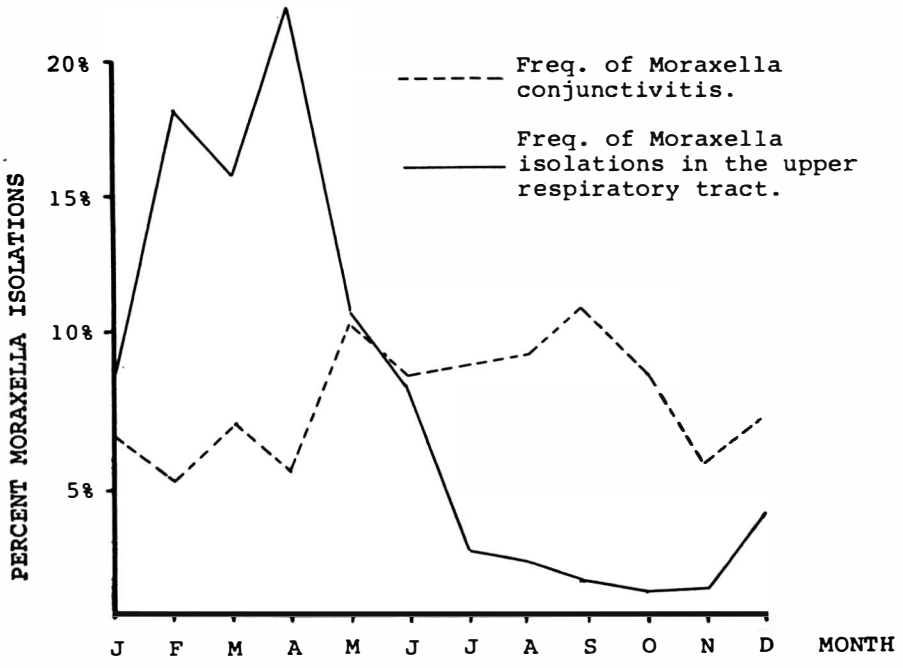

Figure 3 — Superimposition of the frequency polygon of Moraxella conjunctivitis averaged over four years (data of Geis) and the frequency polygon of Moraxella isolations from the upper respiratory tract (children and adults combined).

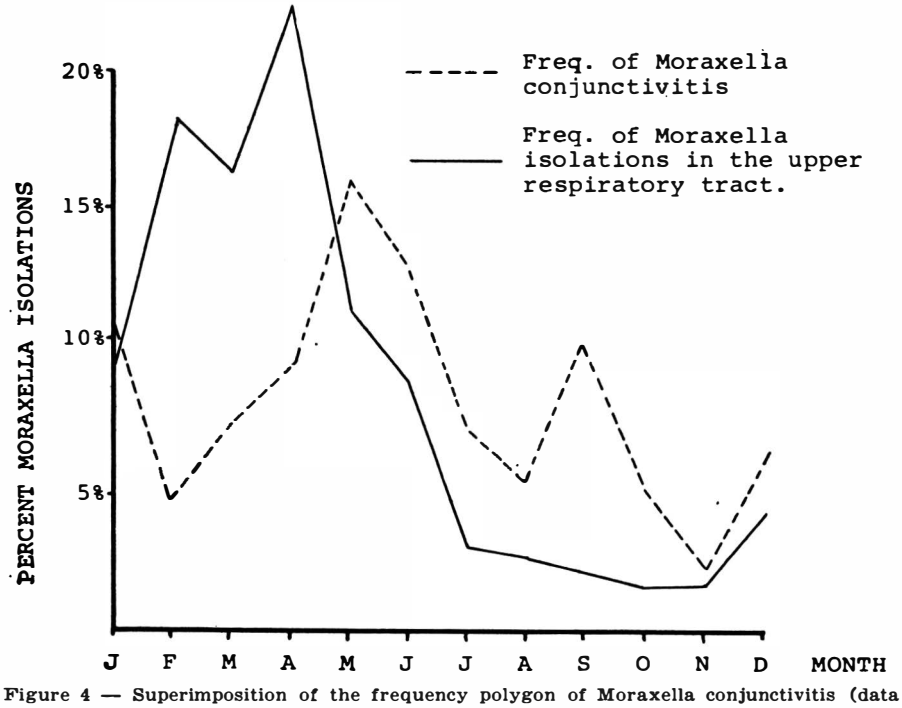

Figure 4 — Superimposition of the frequency polygon of Moraxella conjunctivitis (data of Schmidt) and the frequency polygon of Moraxella isolations from the upper respiratory tract (children and adults combined).

RESUMO E CONCLUSÕES

No inicio deste século, a conjuntivite por Moraxela era encontrada frequentemente. No momento, estes tipos de conjuntivite são observados com frequência menor. Também, no passado, a Moraxella era encontrada com frequência na conjuntiva normal, mas ultimamente esses organismos são apenas encontrados raramente nas membranas conjuntivais sem alterações patológicas.

Alguns autores no passado perceberam que havia uma prevalência sazonal definida da conjuntivite por Moraxella. Somente os dados obtidos por Schmidt, entretanto, demonstram um pico estatisticamente significativo da conjuntivite angular na primavera e no início do verão.

Ultimamente as Moraxellas são encontradas com frequência no trato respiratório superior. O trabalho relato demonstra uma prevalência sazonal definida no número de seus isolados. A incidência pico foi em abril. Embora a incidência dos casos de conjuntivites estudada por Schmidt tenha seu pico em maio, não havia paralelismo próximo entre as frequências relativas de casos de conjuntivites e os isolados do trato respiratóório superior.

BIBLIOGRAFIA

1. LUNDSGAARD, K. K. K. — Bakteriologiske studier over Konjunktivitis. Thesis Kobenhavn, Det Nordiske Forlag, 1900.
2. POLLOCK, W. B. I. — The bacteriology of conjunctivitis. Tr. Ophth. Soc. U.K. 25:3, 1905.
3. GEIS, F. — Ueber das Vorkommen infektiöser Bindehauterkrankungen in Oberbaden. Inaug. Diss. Freiburg, H. M. Poppen, 1907.
4. USHER, C. H., and FRAZER, H. F. — An Analysis of a series of consecutive conjunctivitis cases seen in Aberdeen. Roy. Lond. Ophth. Hosp. Rec. 16:434, 1906.
5. SCHMIDT. P. — Ueber das Vorkommen infectiöser äusserer Augenentzundungen im westfälischen Industriebezirk. Arch. Augenheilk. 45:79, 1902.
6. PILLAT, A. — Zur Topographie der saprophytären Bindehautkeime des menschlichen Auges. von Graefe's Arch. Ophth. 105:778, 1921.
7. VON PELLATHY, B. — Die Bakteriënflora des Bindehautsackes und Bulbusoperationen. Klin. Mbl. Augenheil. 89:108, 1932.
8. JONES, B. R.; ANDREWS, B. E.; HENDERSON, W. G., and SCHOFIELD. P. B. — The pattern of conjunctivits at Moorfields during 1956. Tr. Ophth. Soc. U.K. 77:291, 1957.
9. THYGESON, P., and KIMURA, S. J. — Chronic conjunctivitis. Tr. Am. Acad. Ophth. Otolarying. 67:494, 1963.
10. SMITH, C. H. — Bacteriology of the healthy conjunctiva. Brit. J. Ophth. 38:719, 1954.
11. ORFILA, J., and COURDEN, B. — Contribution à l'étude de la flore conjunctivale normale. Ann. Ocul. 194:892, 1961.
12. SOUDAKOFF, P. S. — Bacteriologic examination of the conjunctiva. A survey of 3000 patients. Am. J. Ophth. 38:374, 1954.
13. HENDRIKSEN, S. D. — Moraxella duplex var nonliquefaciens, habitat and antibiotic sensitivity. Acta Path. Microbiol. 43:157, 1958.
14. KAFFKA, A. — Zum Vorkommen und zur Pathogenität von Moraxella duplex var nonliquefaciens. Zbl. Bakteriol. parasitenk. Infektionskr. Hyg. 164:51, 1955.