RESULTS

The results of the present study were tabulated and presented in the following tables and figures.

Symptomatology :

Table (1) and figure (1-II) show the distribution of different symptoms of giant papillary conjunctivitis syndrome in complaining cases (groups B). They show that itching is the highest symptom which presents in (87.9%), followed by mucus secretion (73.1%), then lens awareness (68.4%), blurring of vision (39.6%), lens movement on blinking 35.7% and lastly is loss of lens tolerance which presents only in 8.2% .

We used the following keys for identification of our study groups:

C.L: Contact lenses

I: Peroid of lens use < 6 months

II: 6 months < period of lens use < 12 months

III: Period of lens use > 12 months

A: Asymptomatic cases

B: Symptomatic cases

D: Daily use of contact lenses

ex: Extended use of contact lenses

G: Group

GIAD: asymptomatic eyes with daily used C.L. for a period < 6 months

GIA ex: asymptomatic eyes with extended used C.L. for a period < 6 months

GIBD: symptomatic eyes with daily used C.L. for a period < 6 months

GIBex: symptomatic eyes with extended used C.L. for a period < 6 months

GIIAD: asymptomatic eyes with daily used C.L. for a period > 6 months and < 12 months

GIIA ex: symptomatic eyes with extended used C.L. for a period > 6 months and < 12 months

GIIBD: symptomatic eyes with daily used C.L. for a period > 6 months and < 12 months

GIIBex: symptomatic eyes with extended used C.L. for a period > 6 months and < 12 months.

GIIIAD: asymptomatic eyes with daily used C.L. for a period > 12 months

GIIIAex: asymptomatic eyes with extended used C. L. for a period > 12 months

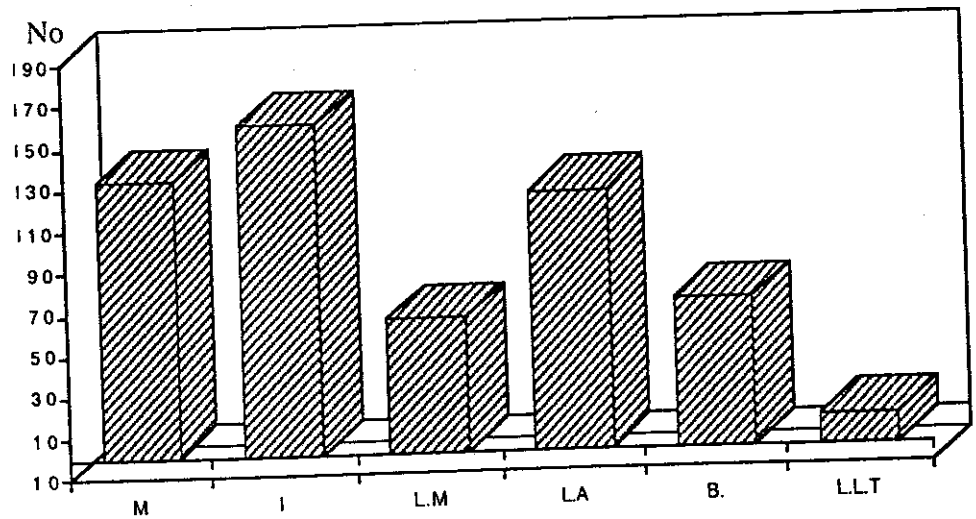
GIIIBD: symptomatic eyes with daily used C.L. for a period > 12 months

GIIIBex : symptomatic eyes with extended used C.L. for a period >12 months.

Table (1) : Distribution of different symptoms in symptomatic eyes (groups B).

Study group	No. of eyes	M.	I.	L.M.	L.A.	B.	L.L.T
I B D	36	18	23	8	19	11	2
I B ex	28	21	25	5	22	10	1
II B D	28	24	26	8	15	10	1
II B ex	32	23	28	14	24	12	1
III B D	28	23	28	14	22	14	5
III B ex	30	24	30	16	23	15	5
Total No	182	133	160	65	125	72	15
%	100	73.1	87.9	35.7	68.4	39.6	8.2

Fig (1-II) Distribution of different symptoms in symptomatic eyes



M. = mucus secretion, I. = itching, L.M. = lens movement, L.A. = lens awareness, B = blurring of vision, L.L.T. = loss of lens tolerance.

Conjunctival translucency (C.T)

We analyzed the data of this study by X^2 with Yates's correction. $P \leq 0.05$ is considered significant.

Table (2) and figure (2-II) show the incidence of conjunctival translucency loss in asymptomatic (groups A) subjects using daily and extended contact lenses and in the control subjects. From this table we can detect that the lowest incidence of conjunctival translucency loss is in asymptomatic subjects wearing daily contact lenses for a period less than 6 months (group IAD), where it is lost in 17.5% of cases.

This table shows that there is no statistically significant difference between daily and extended used contact lenses :

* In group IA where $x^2=0.61$ and ($P>0.05$)
* In group IIA where $x^2=0.01$ and ($P>0.05$)
* In group III A where $x^2=0.14$ and (P.0.05)

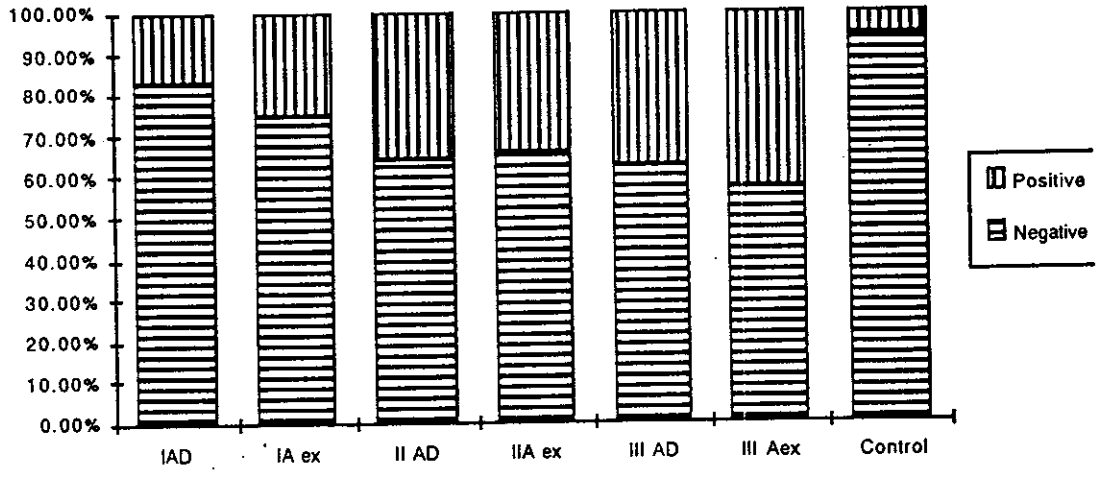
It also shows a high statistically significant difference between the asymptomatic cases and the controls, where $x^2=29.28$ and ($P<0.001$).

Table (3) and figure (3-II) show the same comparison between the symptomatic subjects which demonsterate that there is a statistically significant difference between daily and extended using of contact lenses:

Table (2) : Incidence of conjunctival translucency (C.T) loss in control and non complaining (Asymptomatic) cases.

group	No. of eyes	C. T.				X^2	P
		-ve		+ve			
		No.	%	No.	%		
I A D	40	33	82.5	7	17.5	0.61	>0.05
I A ex	32	24	75	8	25		
II A D	28	18	64.3	10	35.7	0.01	>0.05
II A ex	29	19	65.5	10	34.5		
III A D	29	18	62.1	11	37.9	0.14	>0.05
III A ex	28	16	57.1	12	42.9		
Total	186	128	68.8	58	31.2		
Control	124	117	94.4	7	5.6	29.28	<0.001

Fig (2-II) Incidence of conjunctival translucency (C.T)loss in control and non complaining (Asymptomatic) cases



* In group IB where x^2 = 22.55 and (P<0.01)
* In group IIB where x^2= 9.32 (P<0.01)
* In groupIIIB where x^2=16.62 and (P<0.01)

This means that extended wear contact lenses have a greater effect on the conjunctival translucency in the symptomatic subjects (when the symptoms of contact lens intolerance were developed), while this effect is lesser in asymptomatic subjects.

Results of table (3) show that the highest incidence of conjunctival translucency loss is recorded in symptomatic cases wearing extended used contact lenses for a period more than one year (group III Bex), where it occured in 90% of the cases.

Table (4) and Figure (4-II) show that the difference in conjunctival translucency loss between symptomatic and asymptomatic subjects is highly statistically significant as x^2=45.89 (P<0.001). Conjunctival translucency loss occured in 66.5% of symptomatic cases while it occured in 31.2% of asymptomatic cases.

This table also shows a high statistically significant difference between the controls and the study subjects as x^2=72.92 an (P<0.001).

The conjunctival translucency is lost in 5.6% of control subjects while it is lost in 48.6% of the study cases

Table (3) : Incidence of conjunctival translucency (C.T) loss in symptomatic (complaining) cases "groups B".

group	No. of eyes	C. T.				X^2	P
		-ve		+ve			
		No.	%	No.	%		
I B D	36	25	69.4	11	30.6	27.55	<0.01
I B ex	28	10	35.7	18	64.3		
II B D	28	9	32.1	19	67.9	9.32	<0.01
II B ex	32	6	18.8	26	81.2		
III B D	28	8	28.6	20	71.4	16.62	<0.01
III B ex	30	3	10	27	90		
Total	182	61	33.5	121	66.5		

Fig (3-II) Incidence of conjunctival translucency (C.T) loss in symptomatic (complaining) cases

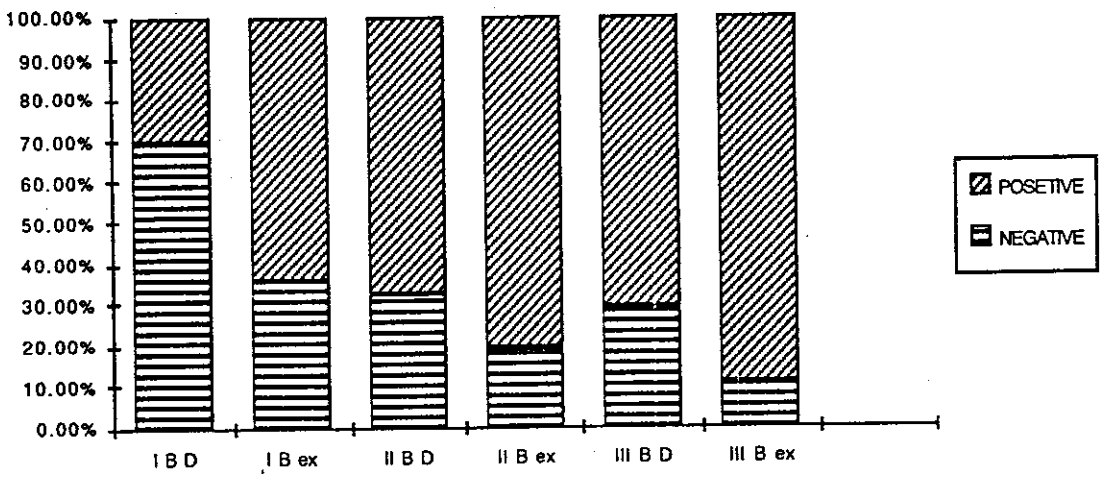


Table (4) : Loss of conjunctival translucency (C.T) in control, asymptomatic and symptomatic cases .

group	No. of eyes	C. T.				X^2	P
		-ve		+ve			
		No.	%	No.	%		
asymptomatic	186	128	68.8	58	31.2	45.89	<0.001
symptomatic	182	61	33.5	121	66.5		
Total	368	189	51.4	179	48.6	72.92	<0.001
Control	124	117	94.4	7	5.6		

Fig. (4-II) Loss of conjunctival translucency in control, symptomatic and asymptomatic cases .

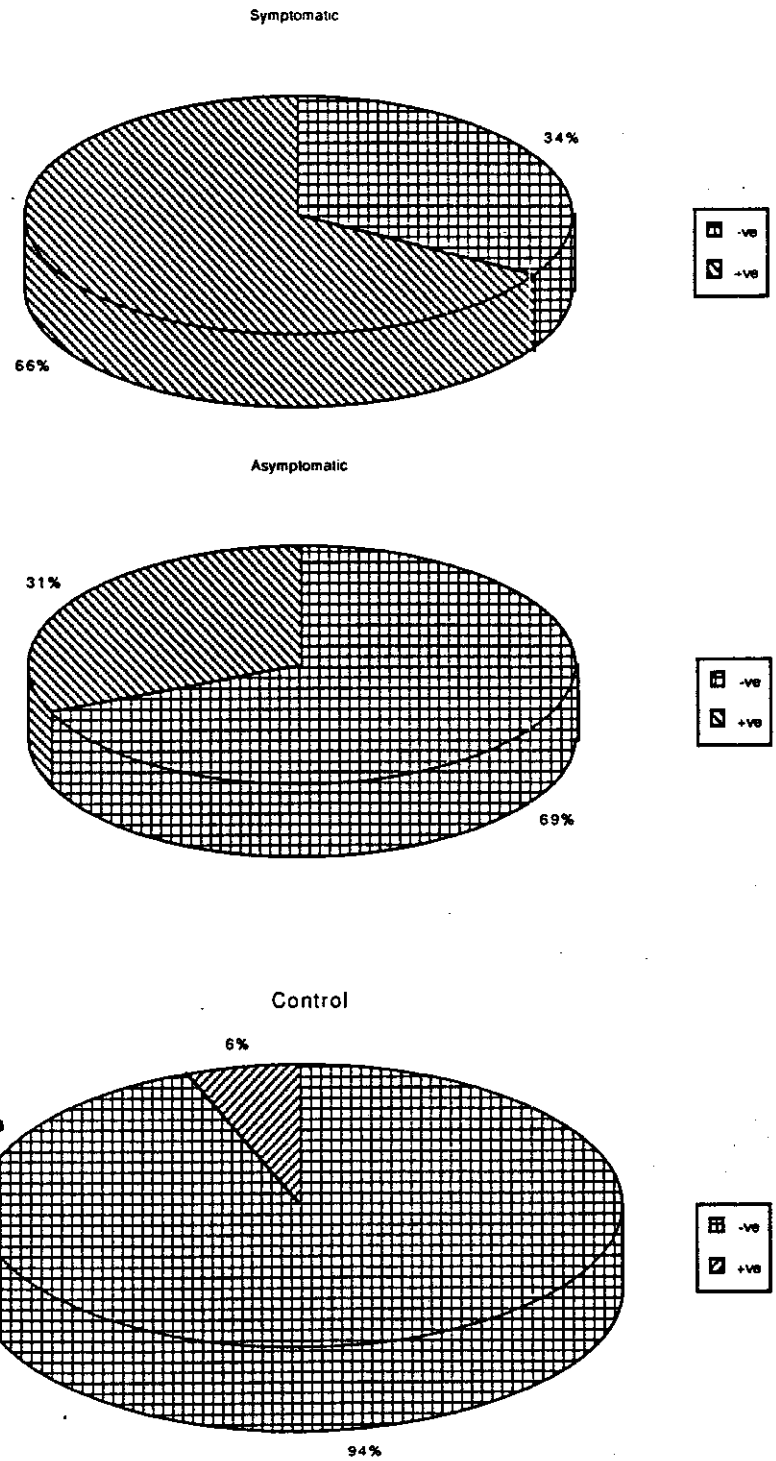
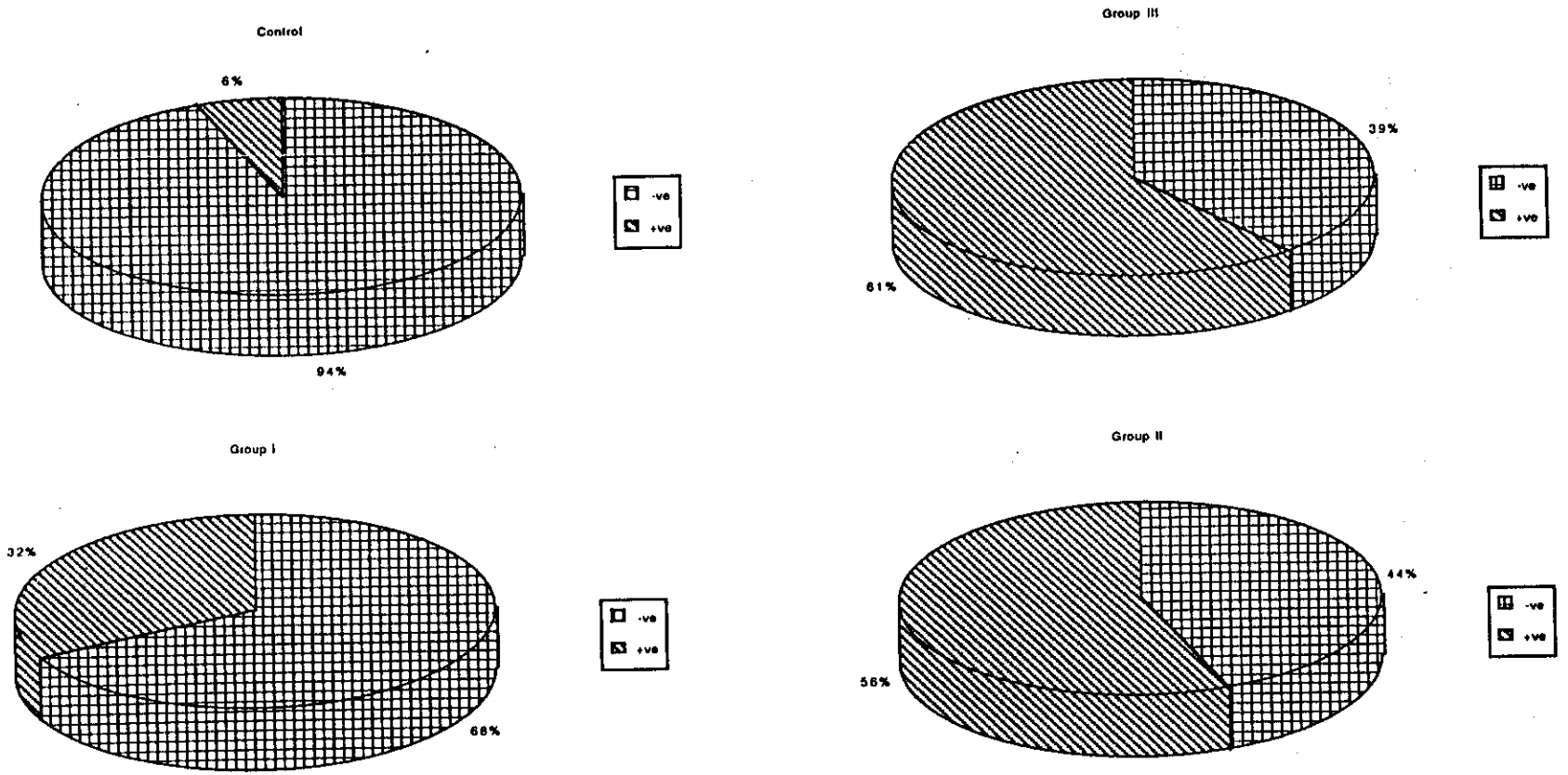


Table (5) : Loss of conjunctival translucency (C.T) in control, and study eyes as regards the period of C.L use.

group	No. of eyes	C. T.				X^2	P
		-ve		+ve			
		No.	%	No.	%		
Control	124	117	94.4	7	5.6		
Group I	136	92	67.6	44	32.4		
Group II	117	52	44.4	65	55.6	23.57	<0.001
Group III	115	45	39.1	70	60.9		
Total	368	189	51.4	179	48.6		

The period of contact lenses use has a significant effect on conjunctival translucency. The ratio of conjunctival translucency loss increases from 32.4% of subjects in GI to 55.6% in GII to 60.9% in GIII. Statistically this difference is highly significant where x^2=23.57 and (P<0.001). Table (5) and Figure (5-II).

Fig. (5-II) Loss of Conjunctival translucency in control and study eyes as regard the period of contact lens use.



Conjunctival hypereamia (C.H)

Table (6) and Figure (6-II) shows comparison between asymptomatic, symptomatic and control subjects as regards conjunctival hypereamia.

In this table we notice that there is no grade +3 conjunctival hypereamia in control subjects, slightly recorded in asymptomatic (1.6% of subjects) cases and markedly recorded in symptomatic (53.8% of subjects) cases. On the other hand conjunctival hypereamia grade 0 is not detected in any case of the symptomatic group , while it is present in 36% of subjects in asymptomatic group and in 44.4% of the control subjects. This means that in the symptomatic eyes, there is marked shiffting of conjunctival hypereamia from grade 0 to grade +3.

Table (6) : Comparison between control, asymptomatic and symptomatic eyes as regards conjunctival hypereamia (C.H).

group	No. of eyes	C. H.								X^2	P
		0		+1		+2		+3			
		No.	%	No.	%	No.	%	No.	%		
asymptomatic	186	67	36.1	85	45.7	31	16.6	3	1.6	236.05	<0.001
symptomatic	182	0.0	0.0	9	5	75	41.2	98	53.8		
Total	368	67	18.2	94	25.5	106	28.9	101	27.4	93.82	<0.001
Control	124	55	44.4	59	47.6	10	8	0.0	0.0		

Fig. (6-II) Comparison between control, asymptomatic and symptomatic eyes as regards conjunctival hypereamia.

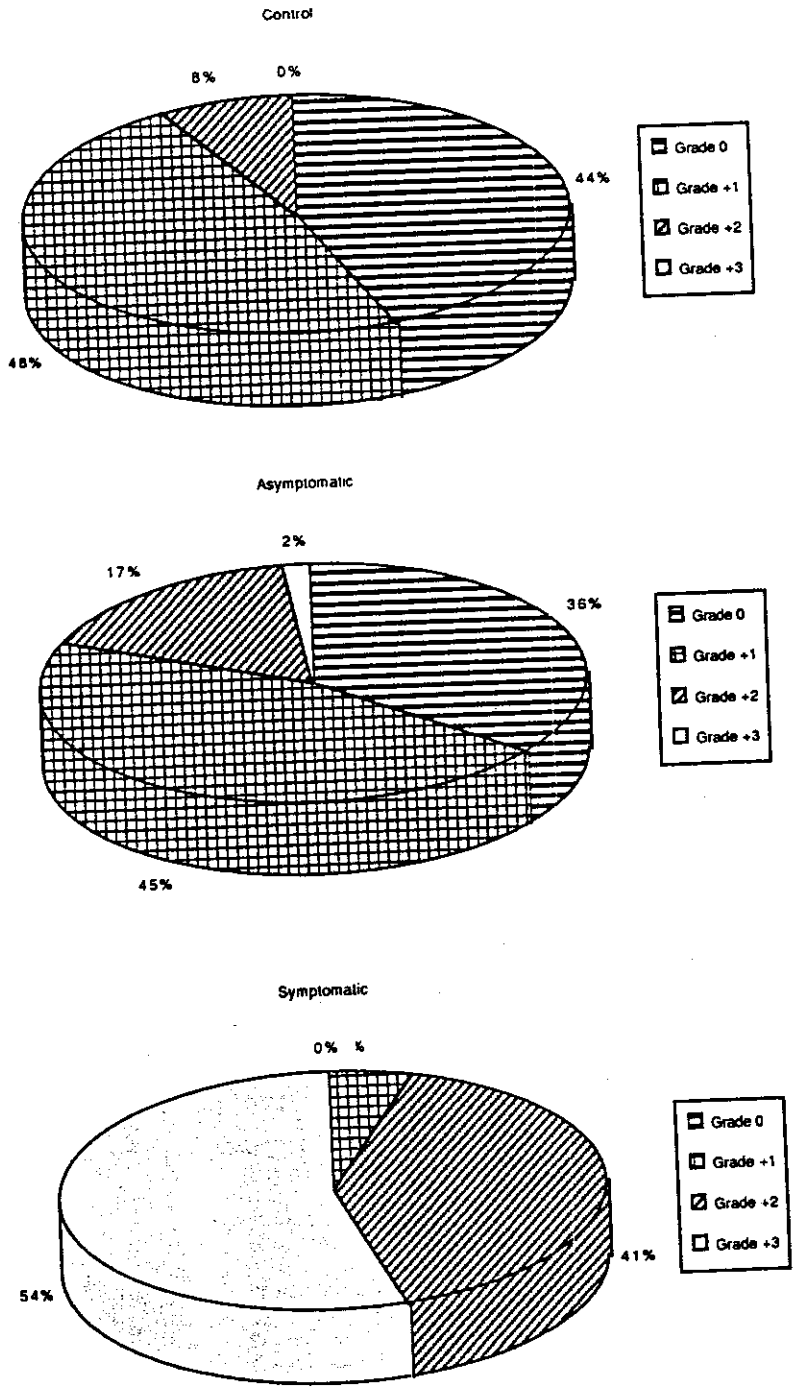


Table (6) shows that the difference in conjunctival hypereamia grades between asymptomatic and symptomatic subjects and between control and total study subjects is statistically highly significant as x^2=236.05 (P<0.001) and x^2=93.82 (P<0.001) respectively .

The difference is still highly significant between symptomatic and control subjects as x^2=236.99 (P<0.001) while it is statistically insignificant between asymptomatic and control subjects as x^2=7.53 (P>0.05).

In table (7) the difference in conjunctival hypereamia grades is insignificant statistically between daily and extended wear contact lenses as x^2=0.16 (P>0.05), while this difference is highly significant statistically between the three study groups GI, GII and GIII as shown in table (8) where x^2=71.47 (P<0.001).

This means that the presence or abscence of symptoms and the period of contact lens use affect on the development of conjunctival hypereamia more than the mode of contact lens use (daily or extended).

Table (7) : The effect of mode of contact lenses use on the conjunctival hypereamia .

group	No. of eyes	C. H.								X^2	P
		0		+1		+2		+3			
		No.	%	No.	%	No.	%	No.	%		
Daily used C.L	189	40	21.1	55	29.2	60	31.7	34	18	0.16	>0.05
Extended used C.L	179	27	15.1	39	21.7	46	25.7	67	37.5		
Total	368	67	18.2	94	25.5	106	28.9	101	27.4		

Table (8) : The effect of period of contact lenses use on the conjunctival hypereamia .

group	No. of eyes	C. H.								X^2	P
		0		+1		+2		+3			
		No.	%	No.	%	No.	%	No.	%		
Group I	136	53	39	21	15.5	38	27.9	24	17.6	71.47	<0.001
Group II	117	13	11.1	35	30	33	28.2	36	30.7		
Group III	115	1	0.8	38	33	35	30.5	41	35.7		
Total	368	67	18.2	94	25.5	106	28.9	101	27.4		

Fig. (7-II) The effect of mode of contact lenses use on the conjunctival hypereamia in comparison to the control eyes.

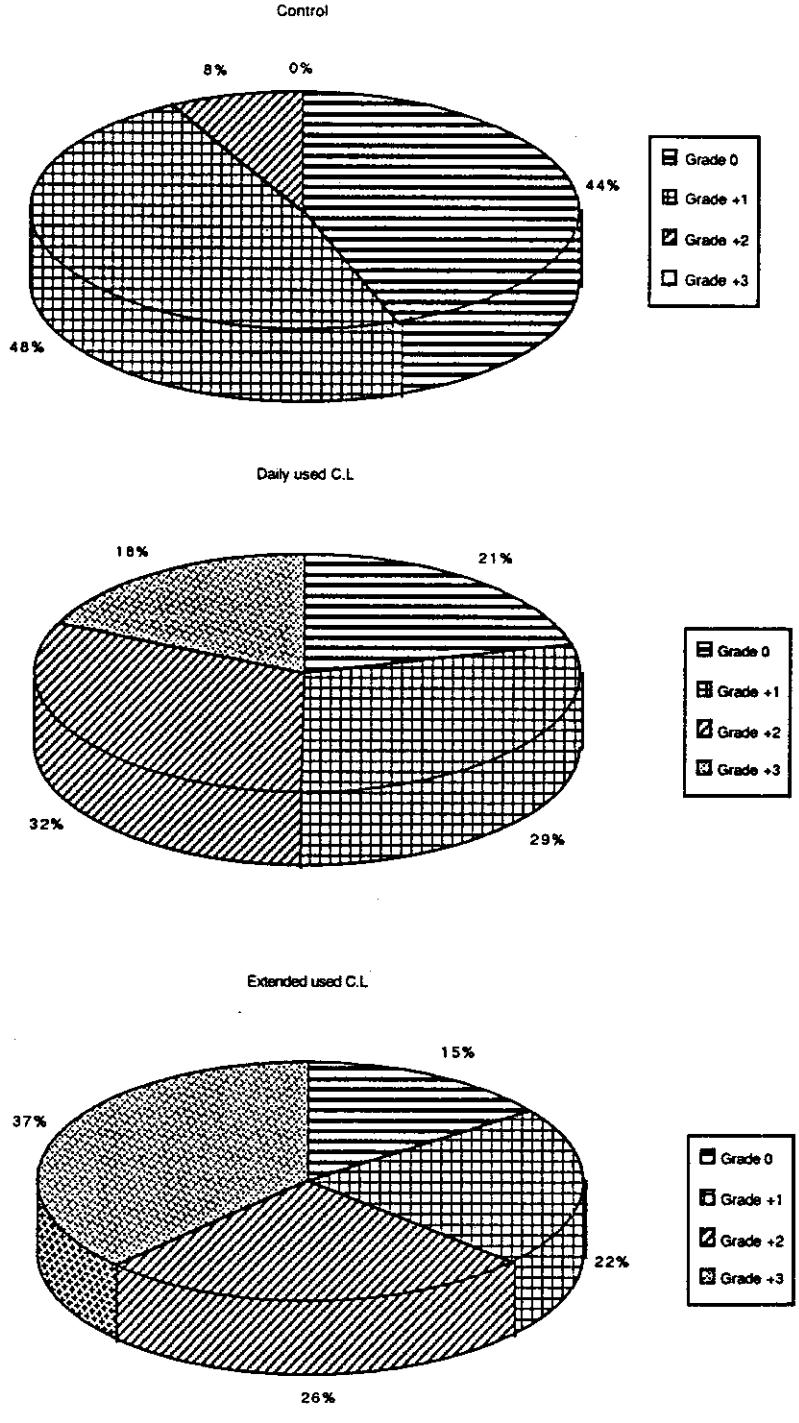
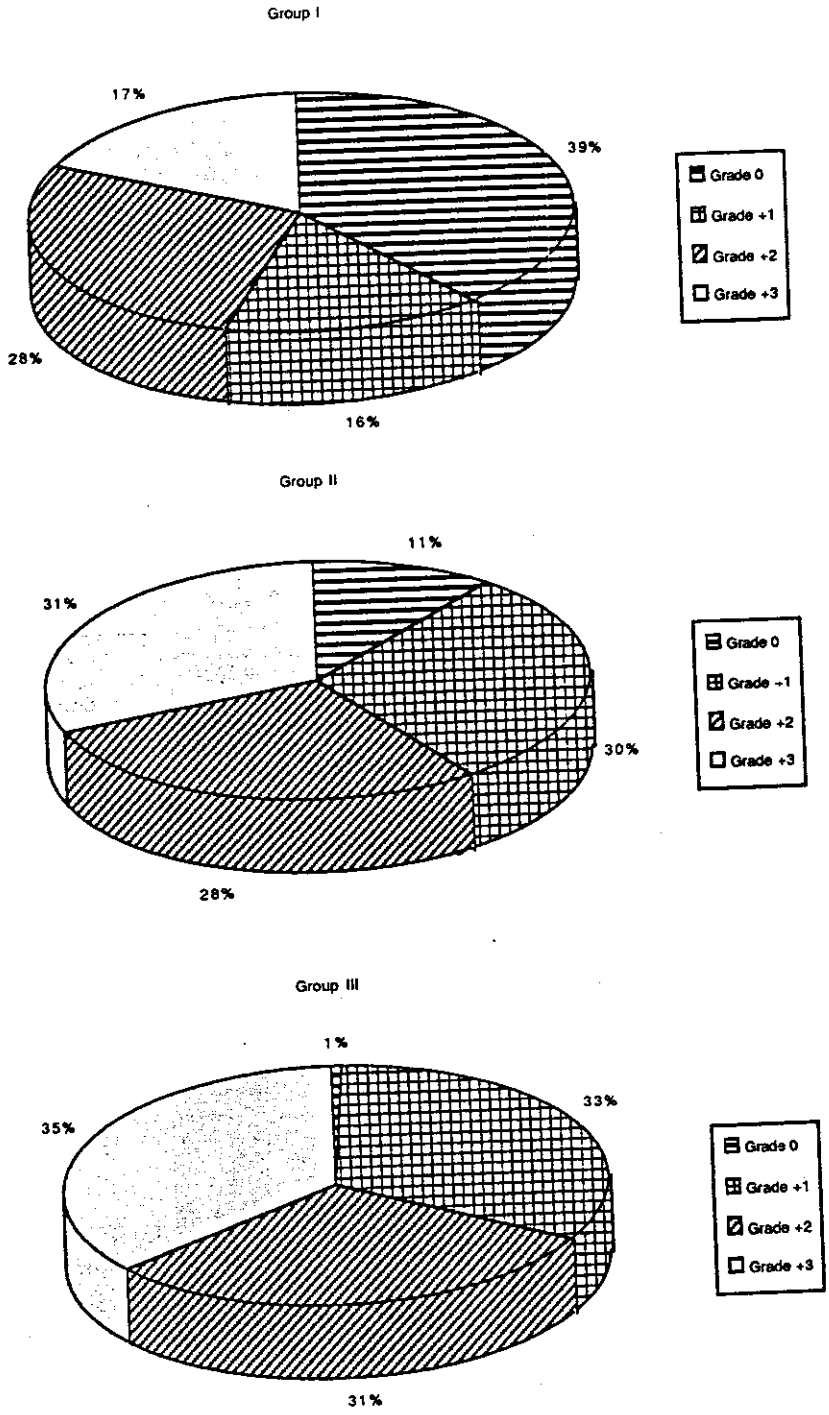


Fig. (8-II) The effect of period of contact lenses use on the conjunctival hypereamia.



Papillary appearance of the conjunctiva

Table (9) and Figure (9-II) which demonstrate the distribution of different types of conjunctival appearance in study and control groups show that: giant papillary appearance of conjunctiva never occcured in control group, most eyes in control group show uniform appearance, 55.7% of subjects, and satin appearance, 37.9% of subjects, while in study groups there is decrease in satin and uniform appearance and on the other hand increase in non uniform and giant papillary appearance.

Table (9) : Distribution of different types of conjunctival appearance in study and control groups.

Group	No of eyes	Conjunctival appearance							
		Satin		Uniform		Non Uniform		Giant	
		No.	%	No.	%	No.	%	No.	%
I A D	40	17	42.5	20	50	3	7.5	-	-
I A ex	32	11	34.4	18	56.3	3	9.4	-	-
I B D	36	-	-	21	58.3	12	33.3	3	8.4
I B ex	28	-	-	11	39.3	13	46.4	4	14.3
II A D	28	8	28.6	17	60.7	3	10.7	-	-
II A ex	29	4	13.8	17	58.6	8	27.6	-	-
II B D	28	-	-	9	32.1	14	50	5	17.9
II B ex	32	-	-	3	9.3	20	62.5	9	28.2
III A D	29	3	10.4	20	68.9	6	20.7	-	-
III A ex	28	-	-	21	75	4	14.3	3	10.7
III B D	28	-	-	10	35.7	11	39.4	7	24.9
III B ex	30	-	-	2	6.6	18	60	10	33.4
Total	368	43	11.7	169	45.9	115	31.3	41	11.1
Control	124	47	37.9	69	55.7	8	6.4	-	-

Fig (9-II) Distribution of different types of conjunctival appearnace in study and control groups.

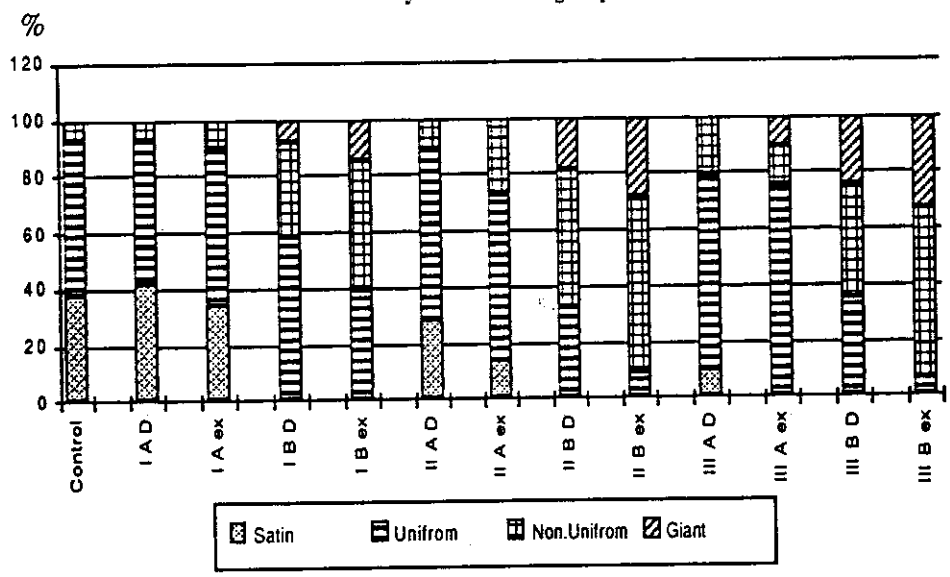


Table (10) shows that no satin conjunctival appearance (normal conjunctiva) is detected in the symptomatic cases (groups B). This means that once the wearing of contact lenses become symptomatic, the conjunctiva shows uniform papillary appearance or more advanced papillary changes.

Table (10) and Figure (10-II) also show that the incidence of satin appearance decreases gradually as the period of contact lens-use increases (it decreases from GI to GII to G III) , it decreases from 42.5% of subjects in GID until it becomes abscent in GIII ex. (cases wearing extended contact lenses for a period more than one year)

Table (10) : Distribution of satin appearance of conjunctiva in asymptomatic (groups A) and symptomatic (groups B) eyes.

Group	Satin appearance %	
	A	B
I D	42.5	..
I ex	34.4	..
II D	28.6	..
II ex	13.8	..
III D	10.4	..
III ex	...	...

Fig (10-II)) Distribution of satin appearance of conjunctiva in asymptomatic (groups A) eyes.

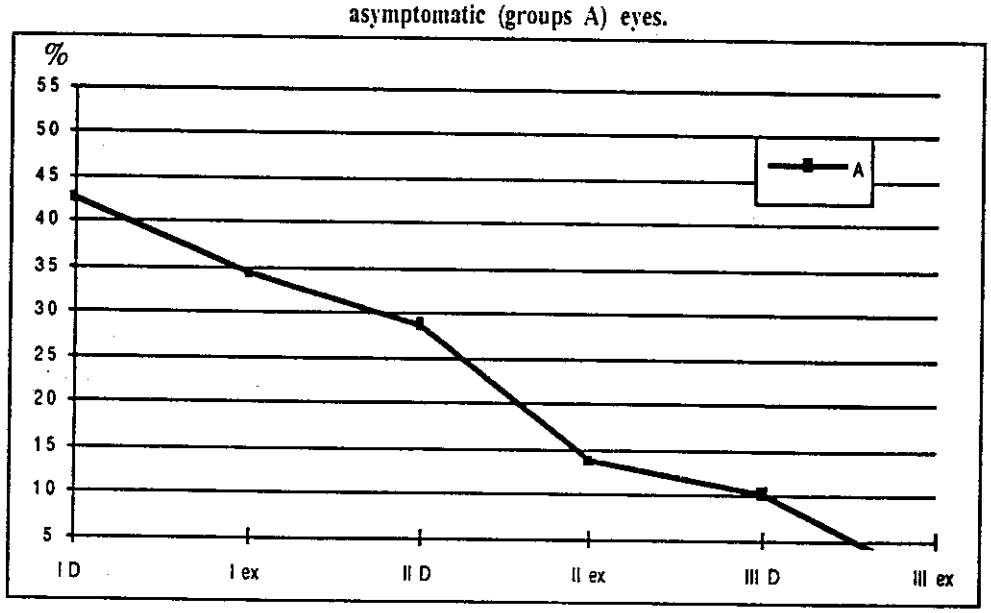


Table (11) and Figure (11-II) show that the uniform conjunctival appearance is nearly equal in GID in asymptomatic and symptomatic subjects, it is present in 50% of asymptomatic cases and in 58.3% in symptomatic cases. In other groups rather than GID, the incidence of uniform conjunctival appearance is higher in asymptomatic than in symptomatic subjects with a statistically significant difference as $x^2=15.55$ ($P<0.01$). The highest difference was recorded in GIII ex where uniform appearance is present in 75% of asymptomatic subjects and only in 6.6% of symptomatic subjects.

The non uniform conjunctival appearance has a higher incidence of occurance in symptomatic cases than in asymptomatic cases as shown in table (12) and Figure (12-II) , but this difference is statistically insignificant as x2=2.21 ($P>0.05$) .

Table (13) and Figure (13-II) show that, in groups A where there is no complain of wearing contact lens , the giant papillary appearance never occured except in group III ex where it was occured in small percentage 10.7% of cases. On the other hand, giant papillary appearance was present in all groups of symptomatic eyes in different percentage with the highest incidence in group III B ex, where it was present in 33.4% of subjects.

Table (11) : Distribution of uniform conjunctival appearance in asymptomatic (groups A) and symptomatic (groups B) eyes.

Group	Uniform appearance %	
	A	B
I D	50	58.3
I ex	56.2	39.3
II D	60.7	32.1
II ex	58.6	9.3
III D	68.9	35.7
III ex	75	6.6
X_2	15.55	
P	<0.01	

Fig (11-II)) Distribution of uniform conjunctival appearance in asymptomatic (groups A) and symptomatic (groups B) eyes.

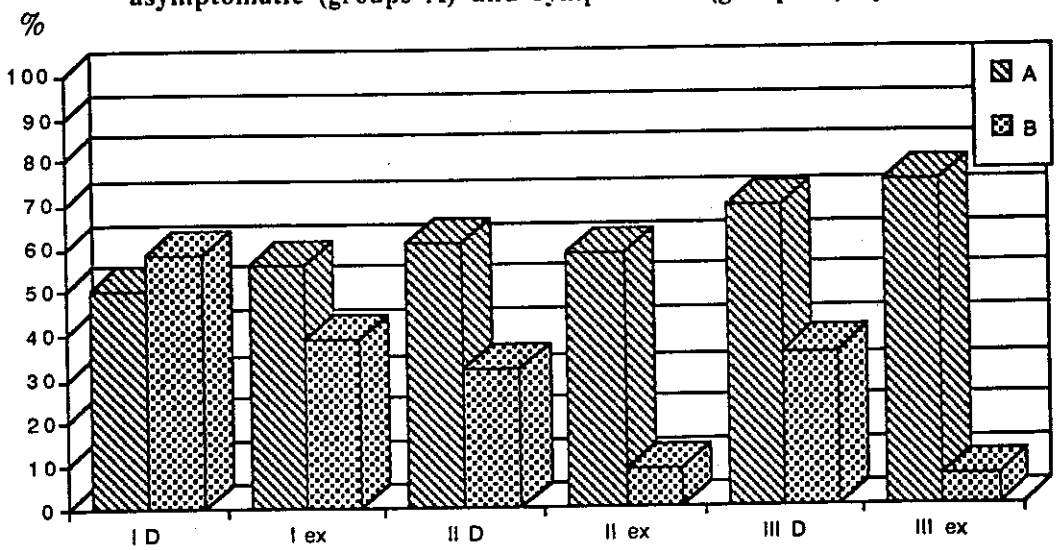


Table (12 : Distribution of non uniform conjunctival appearance in asymptomatic (groups A) and symptomatic (groups B) eyes.

Group	Non uniform appearance %	
	A	B
I D	57.5	33.3
I ex	9.4	46.4
II D	10.7	50
II ex	27.6	62.5
III D	20.7	38.4
III ex	14.3	60
X_2	2.21	
P	> 0.05	

Fig (12-II)) Distribution of non uniform conjunctival appearance in asymptomatic (groups A) and symptomatic (groups B) eyes.

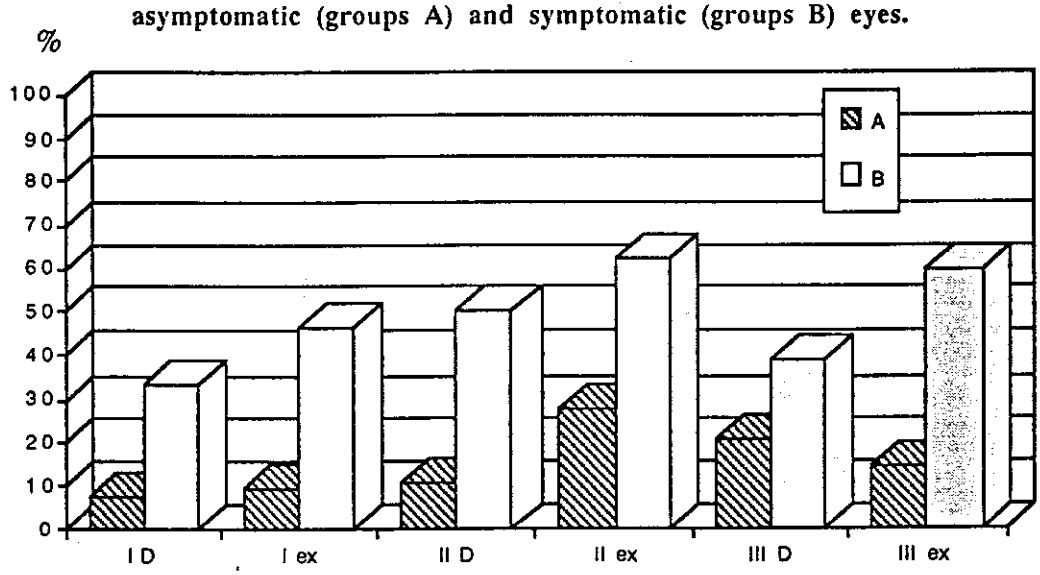


Table (13) : Distribution of giant papillary appearance of the conjunctiva in asymptomatic (groups A) and symptomatic (groups B) eyes.

Group	Giant papillary appearance %	
	A	B
I D	---	8.4
I ex	---	14.3
II D	---	17.9
II ex	---	28.2
III D	---	24.9
III ex	10.7	33.4

Fig (13-II)) Distribution of giant papillary appearance of the conjunctiva in asymptomatic (groups A) and symptomatic (groups B) eyes.

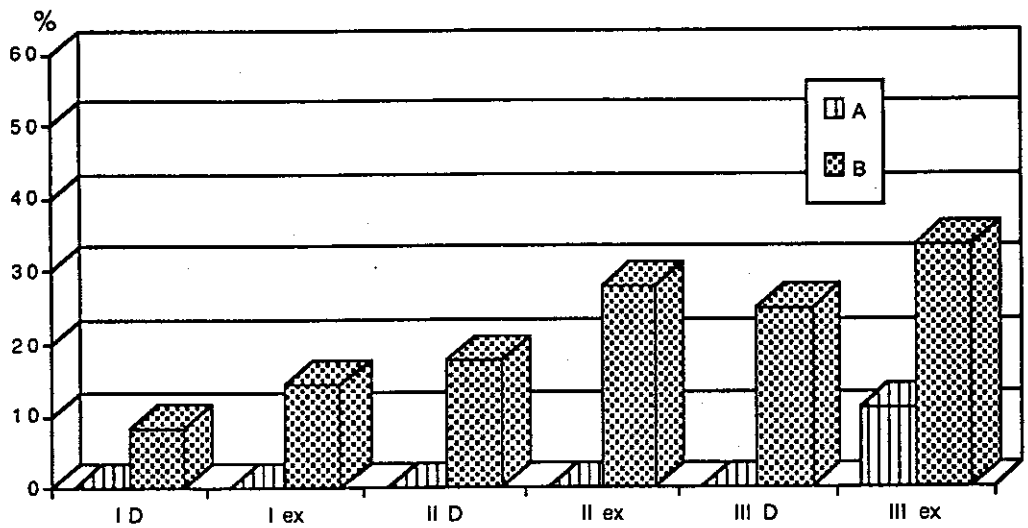


Table (14) and Figure (14-II) show a comparison between the distribution of different types of conjunctival appearance in asymptomatic, symptomatic, total study and control subjects. This table shows that in asymptomatic subjects, uniform papillary appearance has the highest incidence; it is present in 60.8% of cases; satin appearance is detected in 23.1% of subjects, non uniform papillary appearance is detected in 14.5% of subjects and only 1.6% of subjects show giant papillary appearance.

In symptomatic cases, these ratios differ markedly with decrease in satin and uniform papillary appearance and increase in non uniform and giant papillary appearance ratios. No cases in symptomatic group show satin appearance, the uniform papillary appearance is present in 30.8% of subjects, the non uniform papillary appearance is present in 48.4% of subjects, while 20.8% of subjects show giant papillary appearance. Statistically, the difference between asymptomatic and symptomatic groups is very highly significant x^2=124.43 (P<0.0001).

This table also shows that the difference in conjunctival appearance between total study subjects and the controls is statistically highly significant x^2=73.29 (P<0.001).

When we compare the conjunctival appearance in daily and extended used contact lenses regardless the other factors, Figure (15-II) and table (15), we find that the conjunctival appearance changes from satin to uniform to non-uniform to giant papillary appearance in extended used contact lenses than in the daily used and the difference between the two groups is statistically significant as x^2=12.83 (P<0.01) , but not as in between asymptomatic and symptomatic cases where it is very high significant (P<0.0001).

Table (14) : Correlation between the symptomatology and the conjunctival appearance.

group	No. of eves	Conjunctival appearance S No.	S %	U No.	U %	N.U No.	N.U %	G.P No.	G.P %	Total %	X^2	P
asymptomatic	186	43	23.1	113	60.8	27	14.5	3	1.6	100	124.43	<0.001
symptomatic	182	0.0	0.0	56	30.8	88	48.4	38	20.8	100		
Total	368	43	11.7	169	45.9	115	31.3	41	11.1	100	73.29	<0.001
Control	124	47	37.9	69	55.7	8	6.4	0.0	0.0	100		

S=satin appearance U=uniform appearance
N.U=non uniform appearance G.P=giant papillary appearance

Fig (14-II)) Correlation between the symptomatology and the conjunctival appearance.

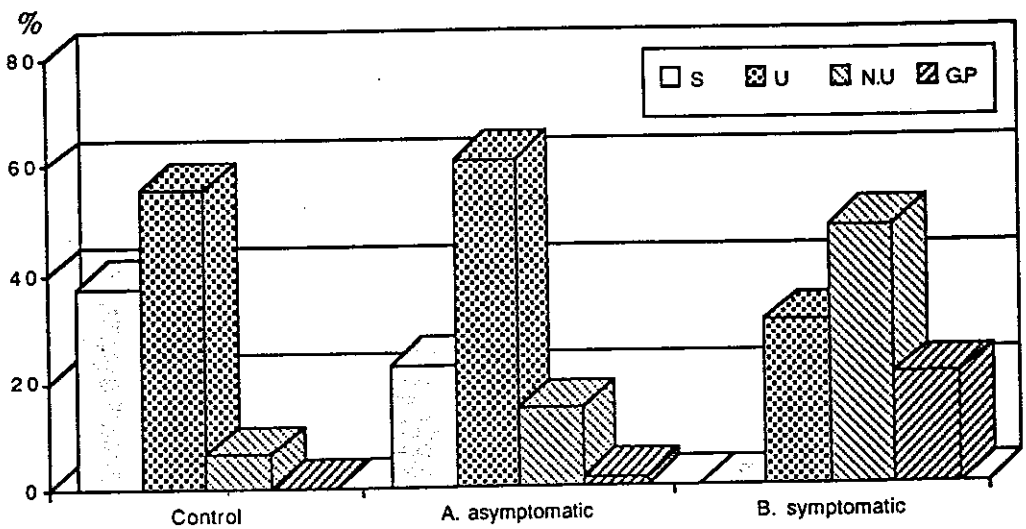
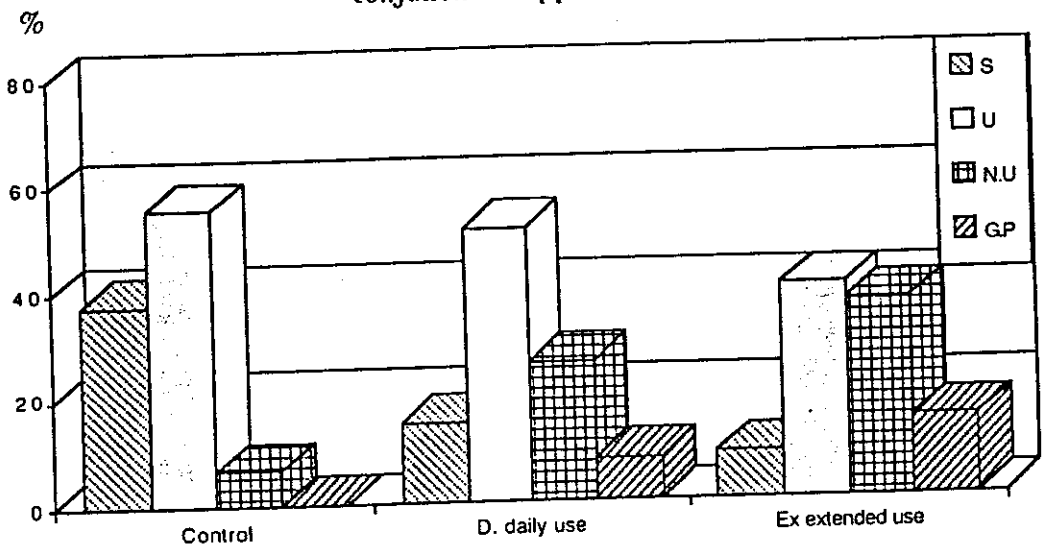


Table (15) : Correlation between the mode of C.L use and the conjunctival appearance.

group	No. of eves	Conjunctial appearance								Total %	X^2 P
		S		U		N.U		G.P			
		No.	%	No.	%	No.	%	No.	%		
Daily use	189	28	14.8	97	51.4	49	25.9	15	7.9	100	12.83 <0.01
Extended use	179	15	8.4	72	40.2	66	36.9	26	14.5	100	
Total	368	43	11.7	169	45.9	115	31.3	41	11.1	100	

Fig (15-II)) Correlation between the mode of C.L use and the conjunctival appearance.



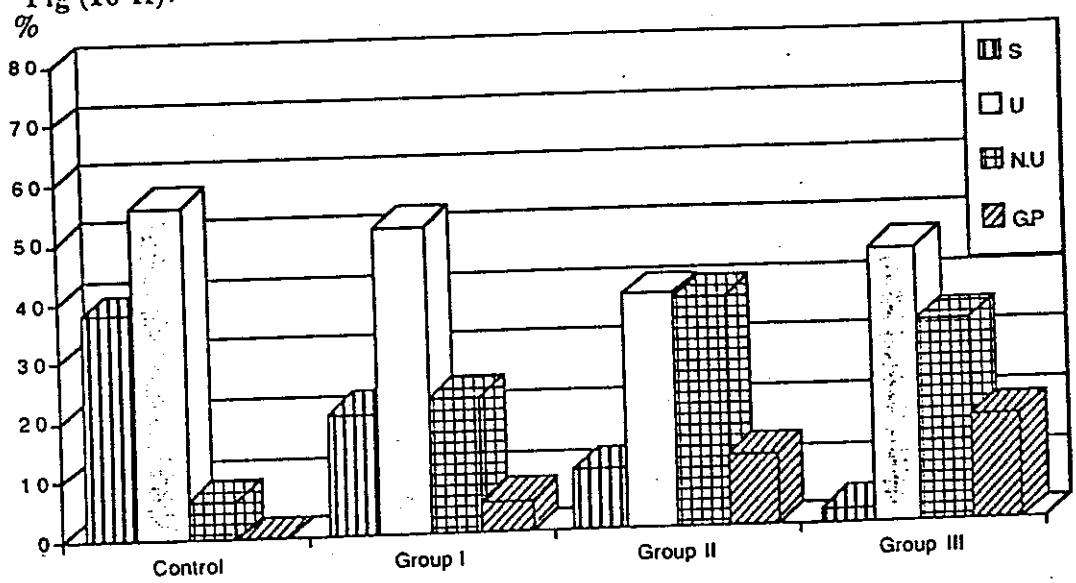
In comparing the papillary appearance of conjunctiva depending on the period of contact lens use, we notice that there is decrease in satin appearance and increase in giant papillary appearance as the period of contact lens use increase (from GI to GII to G III). This difference is statistically highly significant as $x2=33.37$ ($P<0.001$), table (16) and Figure (16-II).

This means that , the changes in conjunctival appearance due to contact lens use show a significant difference ($P<0.01$) between daily and extended use of contact lenses, a high significant difference ($P<0.001$) between the three periods of contact lens use (GI, GII and GIII); and a very high significant difference ($P<0.0001$) between the symptomatic and asymptomatic subjects.

Table (16) : Effect of period of C.L use on the conjunctival appearance.

group	No. of eves	Conjunctial appearance								Total %	X^2	P
		S		U		N.U		G.P				
		No.	%	No.	%	No.	%	No.	%			
Group I	136	28	20.5	70	51.5	31	22.8	7	5.2	100		
Group II	117	12	10.3	46	39.3	45	38.5	14	11.9	100	33.371	<0.001
Group III	115	3	2.6	53	46.1	39	33.9	20	17.4	100		
Total	368	43	11.7	169	45.9	115	31.3	41	11.1	100		

Fig (16-II) Effect of period of C.L use one the conjunctival appearance.



Cytological grades of impression cytology

A good specimen of conjunctiva was generally obtained, although occasionally the filter paper did not pick up materials. (The cases from whom no specimens obtained, not included in this study).

The specimen obtained consisted of sheets of epithelial cells, including goblet cells and impression of goblet cell secretions.

The cell layer varies from one to several cells thick, with occasional gaps where no cells adhere to the filter.

The goblet cells were recognized by their interacellular mucin, which is deeply periodic acid-Schiff positive (rose to red-purple in colour) and has a distincit smooth border.

Extracellular goblet cell secretions (mucus) were also present and can be seen in an area free of cells, or through a thin layer of cells and sometime can be seen extruding from a goblet cell. These secretions are characterized by illdefind borders and stained with both periodic acid-Schiff and hematoxylin and appear rose - red to blue in colour. (Figure 17-II) .

If the filter slide accidentaly while it was in contact with the conjunctiva, the impression smeared into streaks.

In specimens obtained, there was an decrease in the nuclear - cytoplasmic ratio of non goblet epithelial cells with morphological changes of the nucleus, metachromatic change of cytoplasmic colour, emergence of keratinization accompained by decrease in goblet cells

density.These changes were studied using the specific staining reactions of Gill's modified Papanicolaou staining technique in which the cytoplasm of the nonkeratinized epithelial cells stains blue to blue-green and cytoplasm of the keratinized cells stains yellow to pink. We were able to differentiate these changes in which the nonkeratinized secretory conjunctival epithelium gradually changes into a nonsecretory keratinized epithelium (squamous metaplasia) into four different stages:

Staging of conjunctival squamous metaplasia.

Grade 0: normal conjunctival epithelium (Figure 18-II)

The epithelial cells are small and round with esinophilic-staining cytoplasm (blue - green). The nuclei are large, vesicular basophilic with nucleocytoplasmic ratio of 1:2. The goblet cells are abundant, plump, oval and have an intensely PAS positive cytoplasm.

Grade 1: (Figure 19-II)

The epithelial cells are slightly larger and more polygonal and have esinophilic - staining cytoplasm. The nuclei are smaller with nucleocytoplasmic ratio of 1:3. The goblet cells are decreased in number, however they still maintain their plump oval shape with an intensely PAS positive cytoplasm.

Grade 2 : (Figures 20-II, 21-II)

The epithelial cells are larger, polygonal, flattened (squamoid) occasionally multinucleated, with variably staining cytoplasm (blue or

blue-green to mild pinkish in colour). The nuclei are smaller with nucleocytoplasmic ratio 1:4 to 1:5. The goblet cells are markedly decreased in number and are smaller, less intensely PAS positive, with poorly defined cellular borders.

Grade 3:

The epithelial cells become more large and polygonal, markedly squamoid with metachromatic change of the cytoplasm to pinkish colour (basophilic-staining cytoplasm), (Figures22-II, 23-II). Some epithelial cells contained visible keratin filaments and sometime keratohyalin granules (Figures 24-II, 25-II, 26-II). The nuclei are small pyknotic and in many cells, completely absent, the nucleocytoplasmic ratio is greater than 1:6. The goblet cells are completely absent.

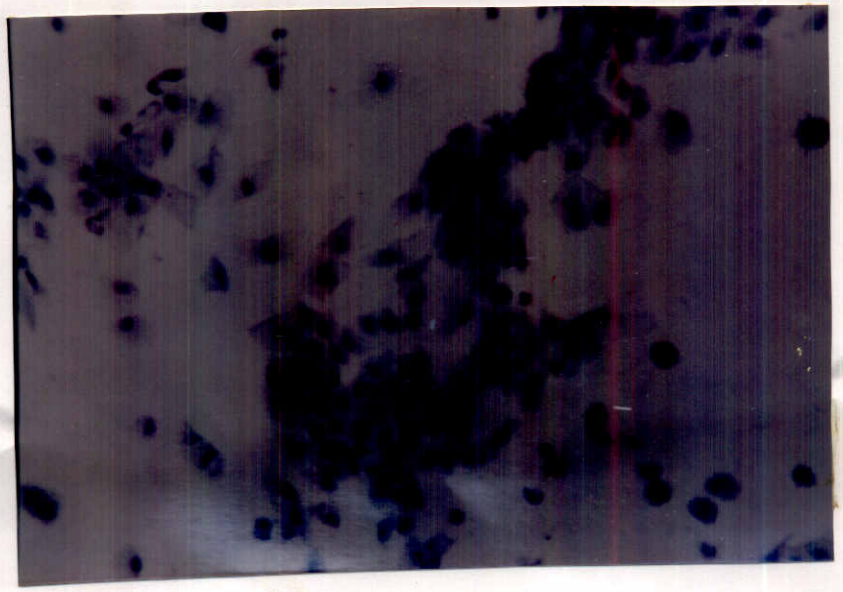


Figure (17-II) Impression cytology specimen shows goblet cell in the process of secretion (In the middle of the picture).

Note that the impressions of goblet cells secretion are seen in an area free of cells , having illdefined borders and take the blue colour of hematoxylin which to some extent obscures the red colour of PAS stain . (magnification x 100).

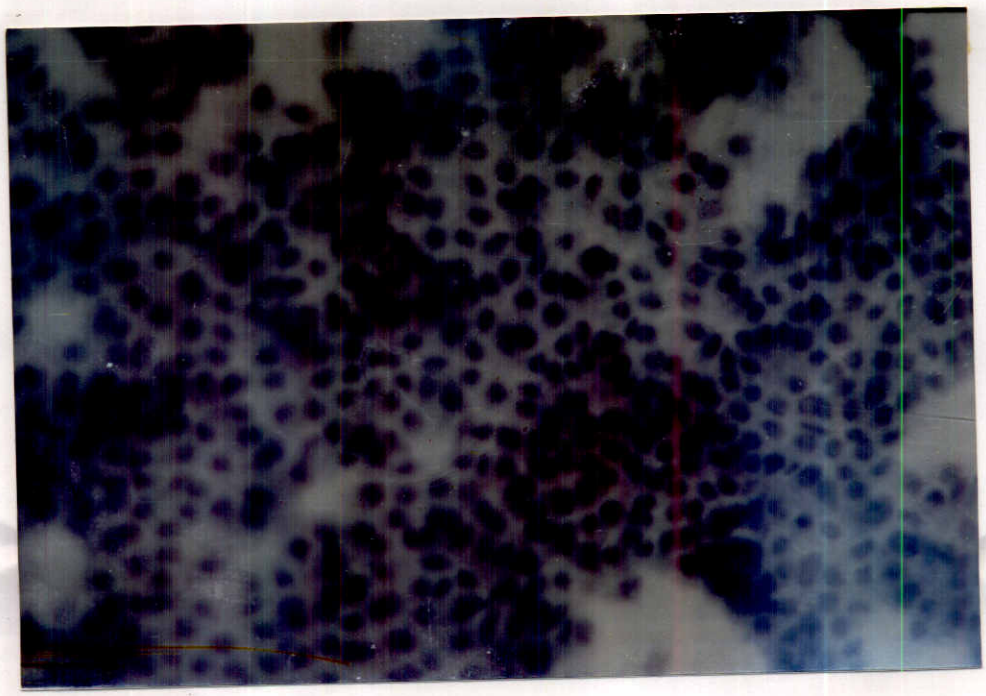


Figure (18-II) conjunctival impression cytology specimen shows normal conjunctiva (squamous metaplasia grade 0.)

Note that the conjunctival epithelial cells are, small, having a blue cytoplasm (scarcely stained with Gill's hematoxylin), a vesicular nucleus , and a nucleus / cytoplasm ratio of 1:2 .The goblet cells are scattered among the epithelial cells , they are round oval in shape with a smooth border, their cytoplasm is stained purpule-red in colour (periodic acid-schiff positive). (magnification x 100).

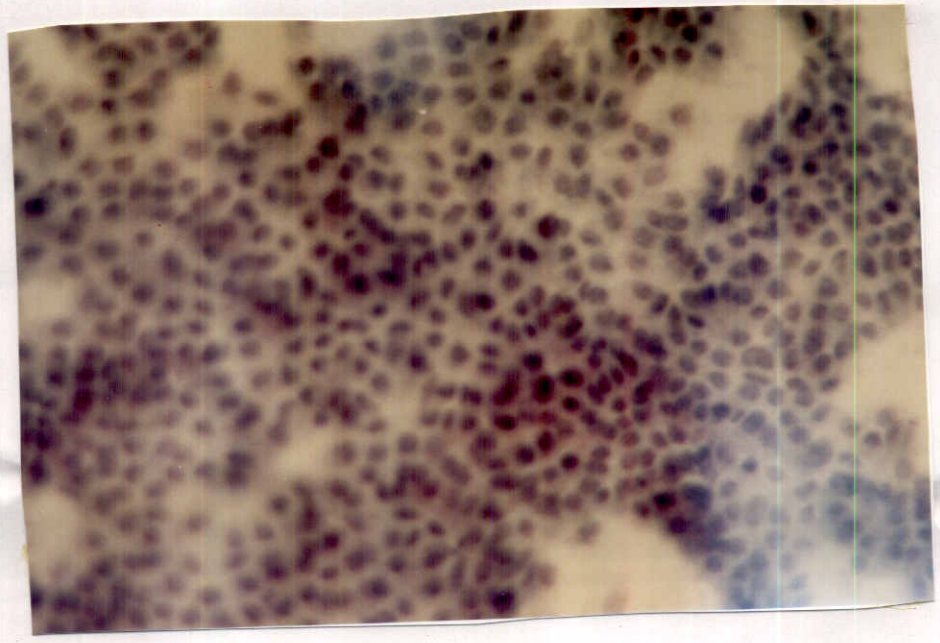


Figure (19-II) conjunctival impression cytology specimen shows squamous metaplasia grade 1.

Note that the epithelial cells are slightly larger and more polygonal .The cytoplasm is blue in colour (esinophilic - staining), having a vesicular nucleus, and a nucleus cytoplasm ratio of 1:3 . Also note the goblet cell impression with illdefined borders scattered among epithelial cells. (magnification x 100)

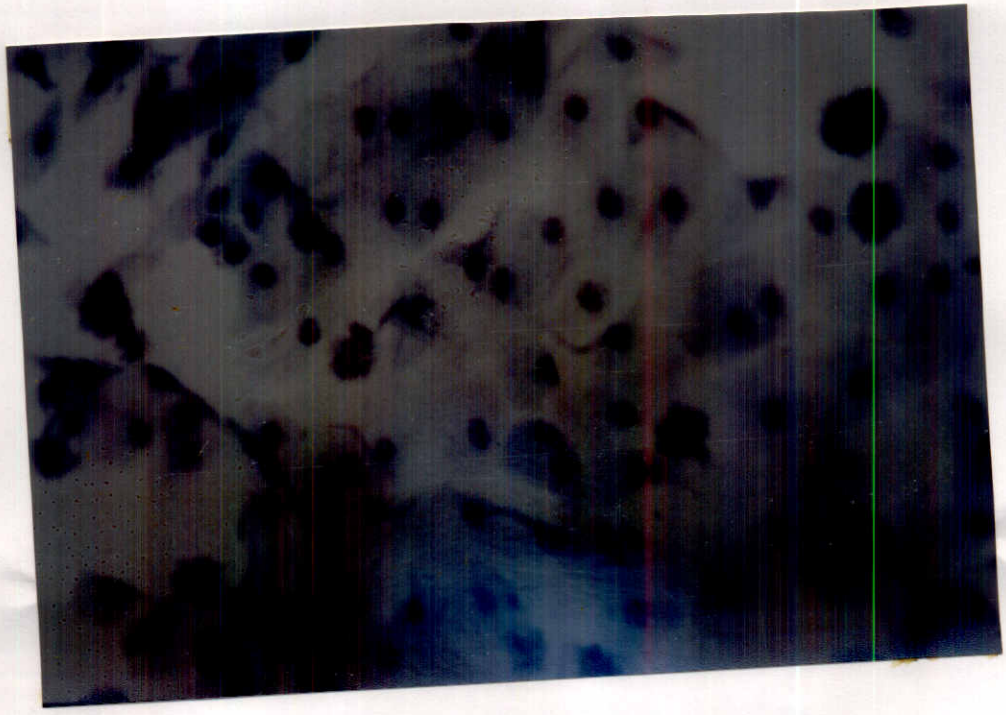


Figure (20-II) conjunctival impression cytology specimen shows squamous metaplasia grade 2

The epithelial cells are large, polygonal and flat (squamoid) with a blue cytoplasm and a nucleus cytoplasm ratio of 1:4.

Note that the goblet cell impressions with illdefined borders decreased in number, scattered among the epithelial cells and less intensely PAS positive .(magnification x 100).

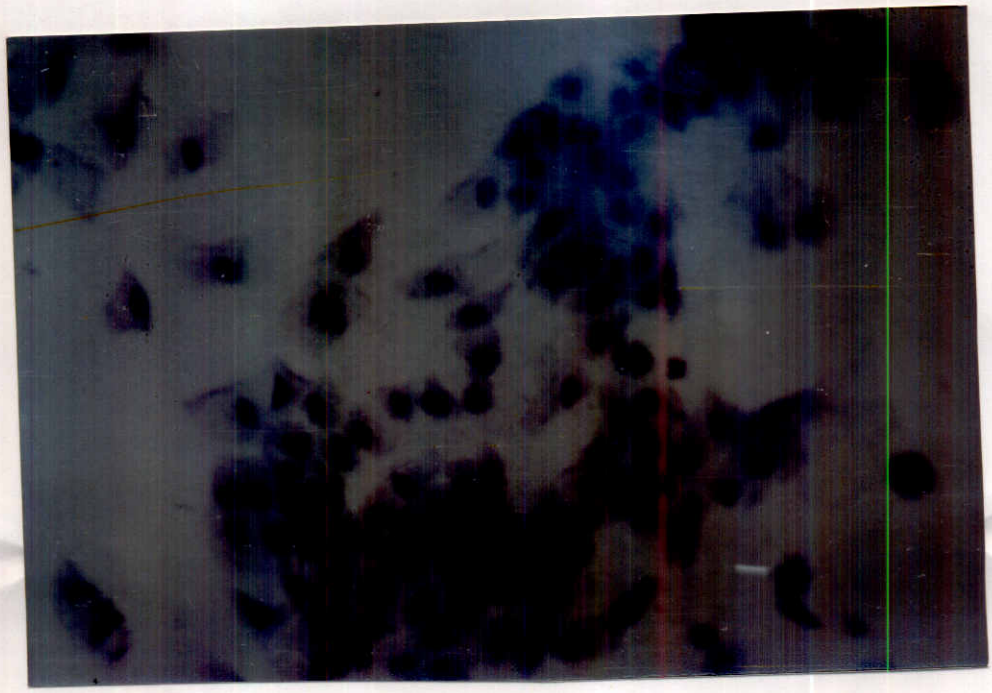


Figure (21-II) conjunctival impression cytology specimen shows squamous metaplasia grade 2

Note that the epithelial cells are more polygonal and flattened (squamoid) with variable staining cytoplasm (blue or blue green to mild pinkish in colour) .The nuclei are small with nucleus cytoplasm ratio of 1:4. to 1:5 . Occasionly double nuclei are present " arrow ". No goblet cell impressions are detected in this specimen. (magnification x 100).

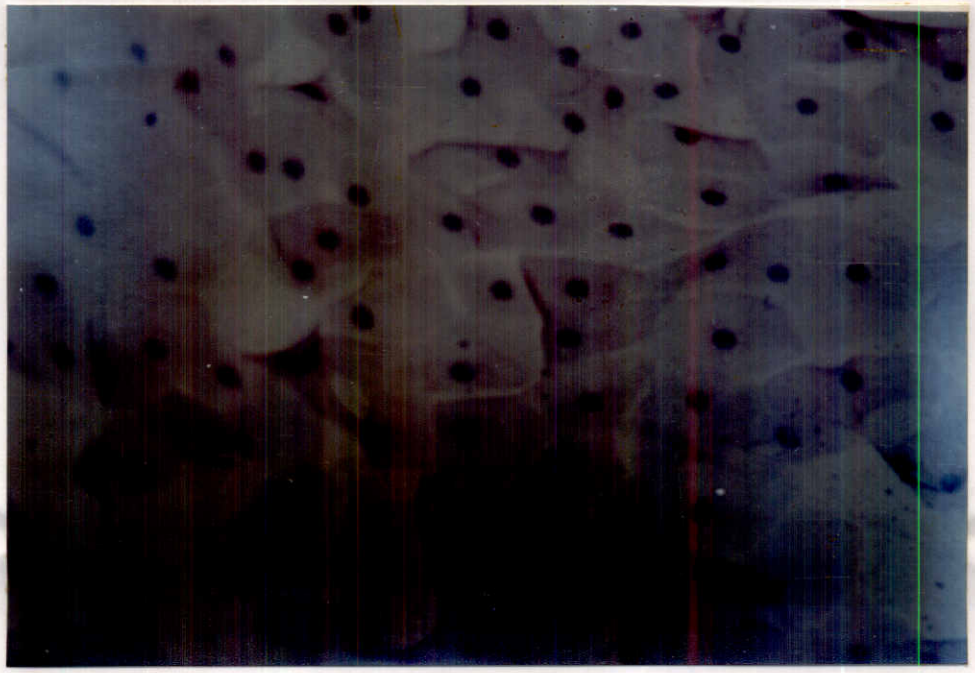


Figure (22-II) conjunctival impression cytology specimen shows squamous metaplasia grade 3

Note that the epithelial cells are markedly squamoid with metachromatic change of the cytoplasm (pinkish in colour), a mild pyknotic nucleus with a nucleus cytoplasm ratio of 1:6 to 1:7 . Also there is complete absence of goblet cells and /or their impression.. (magnification x 100).

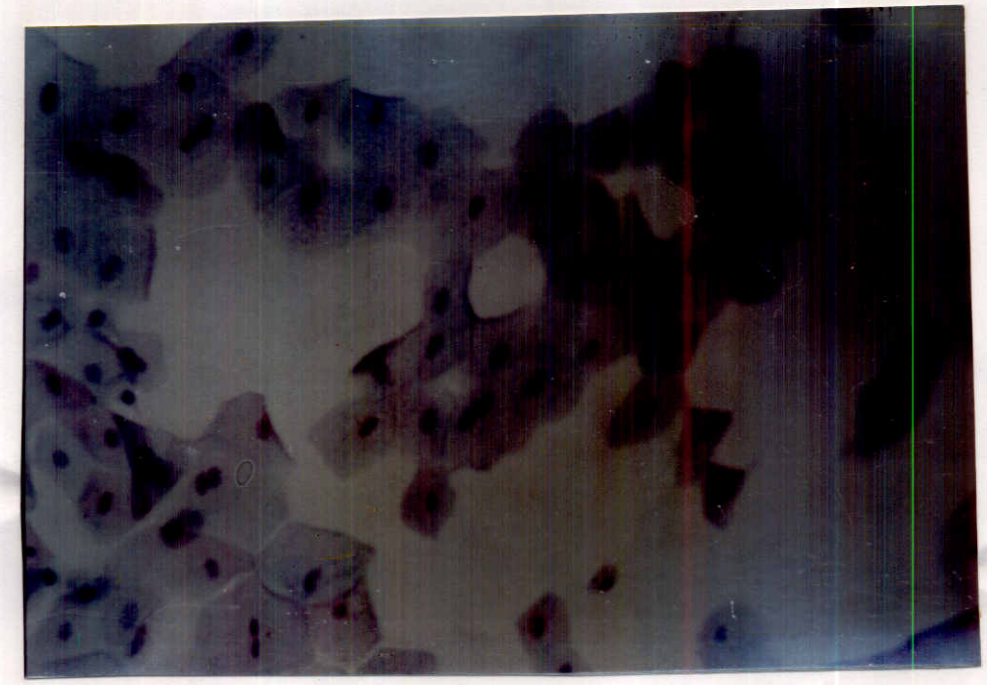


Figure (23-II) conjunctival impression cytology specimen shows squamous metaplasia grade3

The epithelial cells are markedly flattened (squamoid) with purple to pinkish colour cytoplasm . Some epithelial cells have two nuclei with a nucleus cytoplasm ratio of 1:7. Note complete absence of goblet cells and their secretions in this specimen. (magnification x 100).

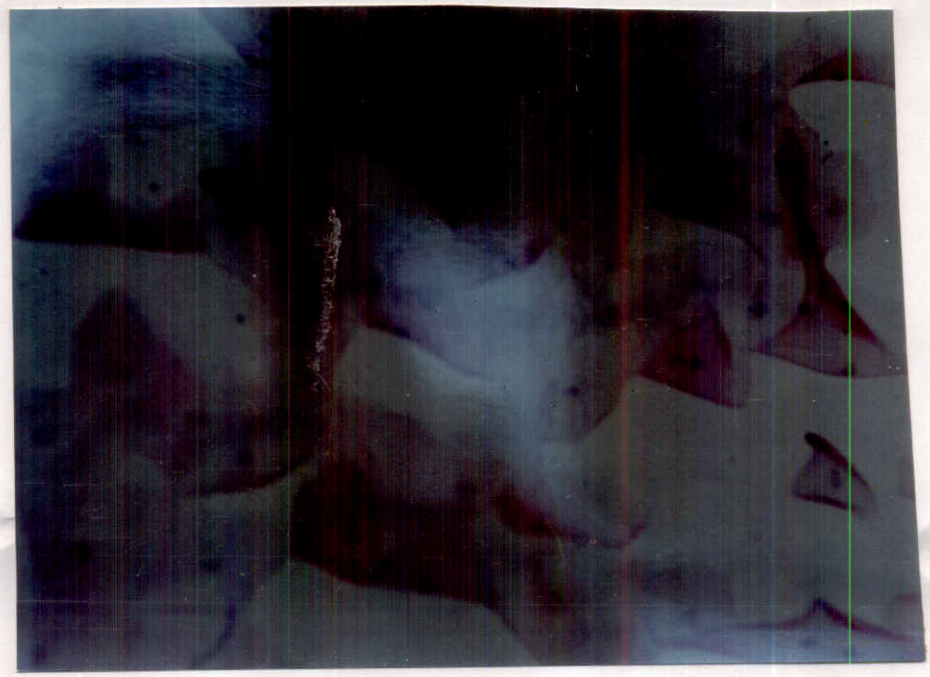


Figure (24-II) conjunctival impression cytology specimen shows squamous metaplasia grade 3

Note that the epithelial cells are markedly enlarged and squamoid with many cells containing keratinized cytoplasm (pink) spyknotic nucleus, and anucleus cytoplasm ratio of 1:7 or more . Also note the complete absence of goblet cells and /or their impressions . (magnification x 100).

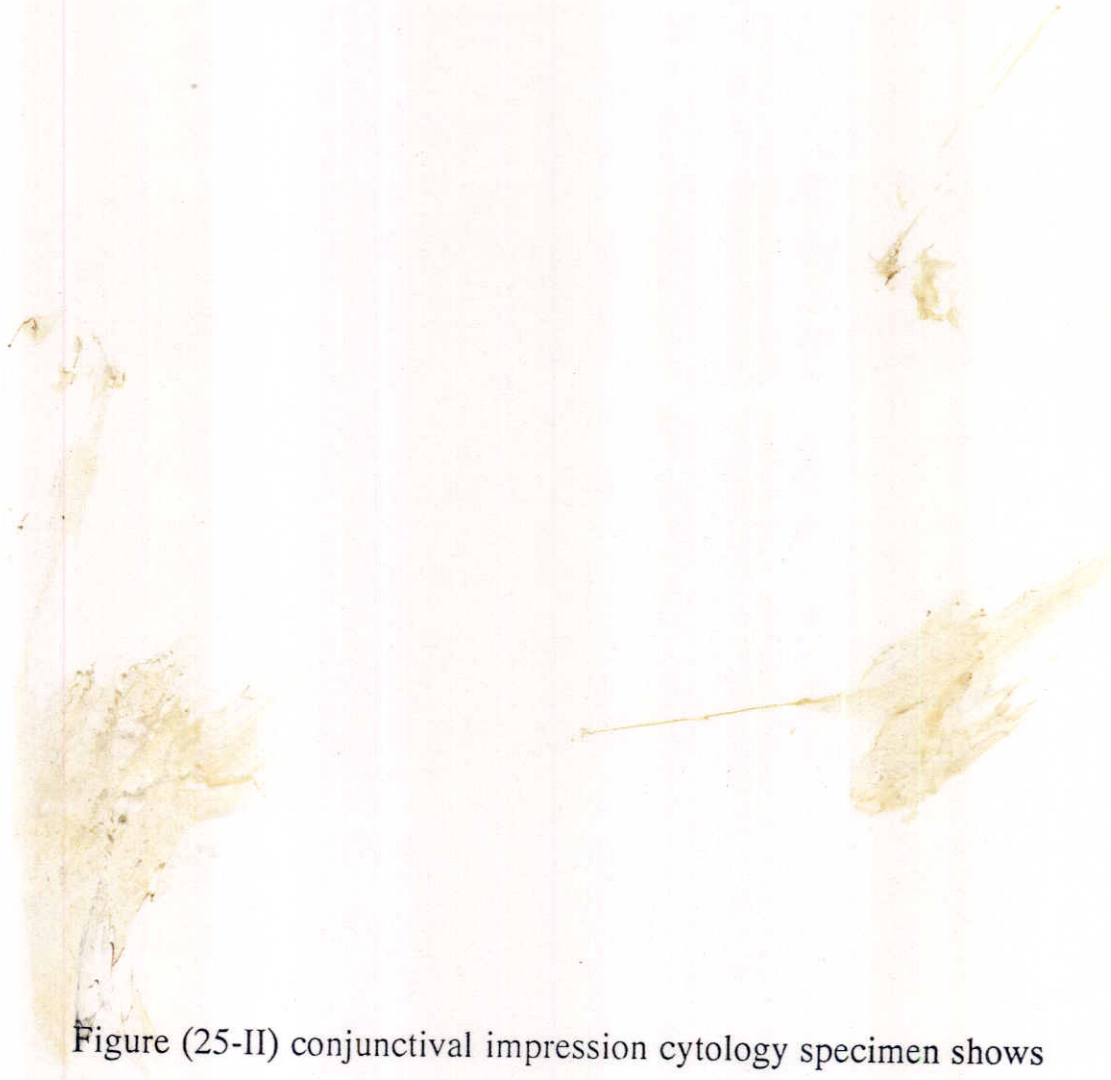


Figure (25-II) conjunctival impression cytology specimen shows squamous metaplasia grade 3

Note that the epithelial cells have keratinized shrunken cytoplasm (basophilic), the nuclei are markedly pyknotic with some cells containing lytic nuclei , or no nuclei . The nucleus cytoplasm ratio is more than 1:6 . Also note the complete absence of goblet cells and / or their impressions . (magnification x 100).

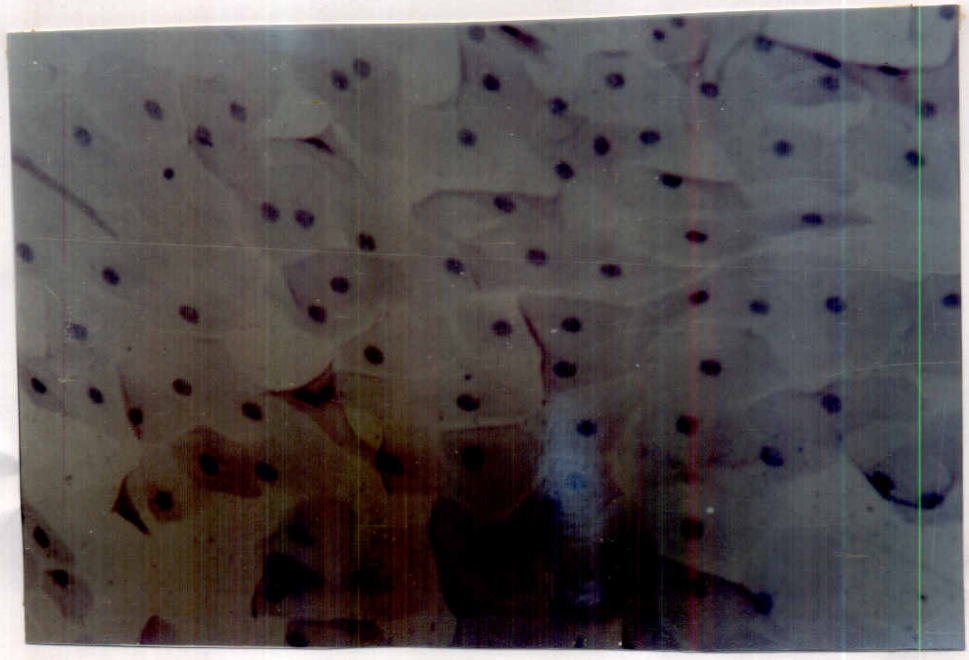


Figure (26-II) conjunctival impression cytology specimen shows squamous metaplasia grade 3

Note that the epithelial cells are squamoid with basophilic staining cytoplasm . Some epithelial cells have keratin filaments . The nuclei are small and pyknotic in some cells with nucleus cytoplasm ratio of 1:7 or more. Double nuclei are present in some cells . There is complete absence of goblet cells and/ or their impression (magnification x 100).

Distribution of cytological grades

Table (17) and Figure (27-II) present a comparison between all studied groups and the control subjects as regards the cytological grades of conjunctival impression cytology.

In specimens from the control eyes (124 eyes) more than half of them (66 eyes; 53.2%) have normal conjunctiva with cytological grade 0, while grade 1 is present in 47 eye; 37.9% of subjects and grade 2 is present in 10 eyes ; 8.1% of subjects. Only one eye(0.8%) shows squamous metaplasia grade 3 .

The same table also shows that grade 3 squamous metaplasia was not detected in asymptomatic cases wearing contact lenses for a period less than six months (GIAD and GIA ex), while in the same period; the symptomatic subjects show squamous metaplasia grade 3 in 13.8% and 21.4% of subjects in daily and extended used contact lenses respectively (GIBD and GIBex).

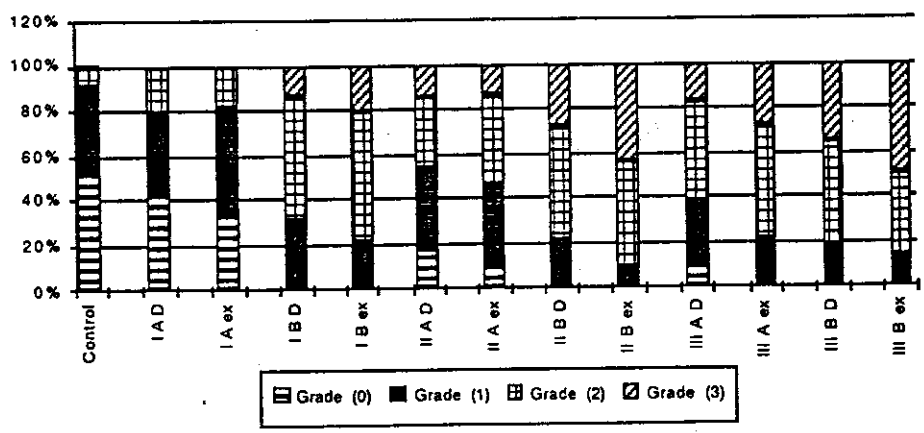
The highest incidence of squamous metaplasia grade 3 was detected in symptomatic subjects wearing extended used contact lenses for a period more than one year (GIII Bex) as it is occured in 43.7% of subjects(Table 17).

Table (17) also shows that there is no normal conjunctiva (cytological grade 0) in the symptomatic cases (groups B). This means that when symptoms of contact lens intolerance syndrome develop, the conjunctiva shows pathological changes.

Table (17) : Distribution of the cytological grades in the control and study groups.

Group	No of eyes	Cytological grade							
		0		1		2		3	
		No.	%	No.	%	No.	%	No.	%
Control	124	66	53.2	47	37.9	10	8.1	1.0	0.8
I A D	40	17	42.5	14	35	9	22.5	0.0	--
I A ex	32	11	34.4	15	46.9	6	18.7	0.0	--
I B D	36	0.0	--	11	31	20	55.2	5	13.8
I B ex	28	0.0	--	6	21.4	16	57.2	6	21.4
II A D	28	5	17.9	10	35.7	9	32.1	4	14.3
II A ex	29	3	10.3	10	34.5	12	41.4	4	13.8
II B D	28	0.0	--	6	21.4	14	50	8	28.6
II B ex	32	0.0	--	3	9.4	15	46.9	14	43.7
III A D	29	3	10.3	8	27.6	13	44.8	5	17.2
III A ex	28	0.0	--	6	21.4	14	50	8	28.6
III B D	28	0.0	--	5	17.9	13	46.4	10	35.7
III B ex	30	0.0	--	4	13.3	11	36.7	15	50
Total	368	39	10.6	98	26.6	152	41.3	79	21.5

Fig (27-II)) Distribution of the cytological grades in the control and study groups.



A gain, normal conjunctiva was not detected in asymptomatic cases wearing extended used contact lenses for a period more than one year (GIIIA ex), although there was no complain, where its highest incidence was detected in asymptomatic subjects wearing daily used contact lenses for less than six months (GIAD), as it was present in 42.5% of subjects.

Table (18) demonstrates the pathological changes of conjunctiva in asymptomatic, symptomatic, total study and control subjects.

In asymptomatic subjects, cytological grades 1 and 2 were present in equal percentage 33.9% of subjects, followed by grade 0 in 20.9% of subjects and lastly the cytological grade 3 as it was present in 11.3% of subjects.

In symptomatic cases, these ratios differ markedly, we find that grade 2 cytological change has the highest incidence as it is present in 48.9% of subjects followed by grade 3 in 31.9% of subjects, while grade 1 is present in 19.2% of subjects and no normal conjunctiva (grade 0) was recorded.

This means that there is a significant shift of the cytological grades from grade 0 to grade 3 in symptomatic eyes rather than asym ptomatic. Statistically this shift or difference is highly significant as $x2=68.74$ ($P<0.001$).

Comparison between the total study subjects and the controls, the difference in cytological grades distribution also has high statistic significance as $x2=138.44$ ($P<0.001$). (Table 18)

Figure (28-II) shows the correlation between symptomatology and the cytological grades.

In study the effect of period of contact lens use on the development of conjunctival pathological changes, table (19) and Figures (29-II, 30-II) show that the highest incidence of grade 0 cytological change is detected in group I (less than 6 months of contact lens use); 20.6% of subjects and its lowest incidence is detected in GIII (more than one year of contact lens use); 2.6% of subjects. In contrast, grade 3 cytological change has the highest incidence in GIII; 21.5% of subjects, and the lowest in GI; 8.1% of subjects.

Table (19) : Correlation between length of contact lenes wear and the cytological grades.

group	Cytological grades								Total		X2	P
	0		1		2		3					
	No.	%	No.	%	No.	%	No.	%	No.	%		
I<6 months	28	20.6	46	33.8	51	37.5	11	8.1	136	100		
II 6>12months	8	6.8	29	24.8	50	42.7	30	25.7	117	100	46.24	<0.001
III>12months	3	2.6	23	20	51	44.4	38	33	115	100		
Total	39	10.6	98	26.6	152	41.3	79	21.5	368	100		

This table shows a shift of cytological changes from grade 0 to grade 3 with increase the period of contact lens use, this shift statistically is highly significant as x^2=46.24 (P<0.001)

Fig (29-II)A) Correlation between length of contact lens wear and the cytological grades

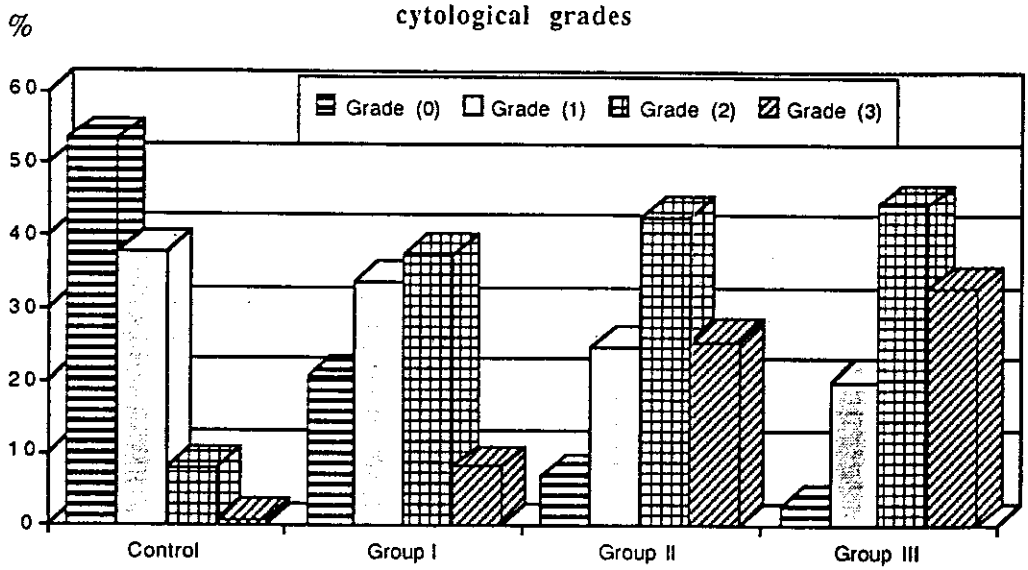


Fig (30-II)B) Correlation between length of contact lens wear and the cytological grades

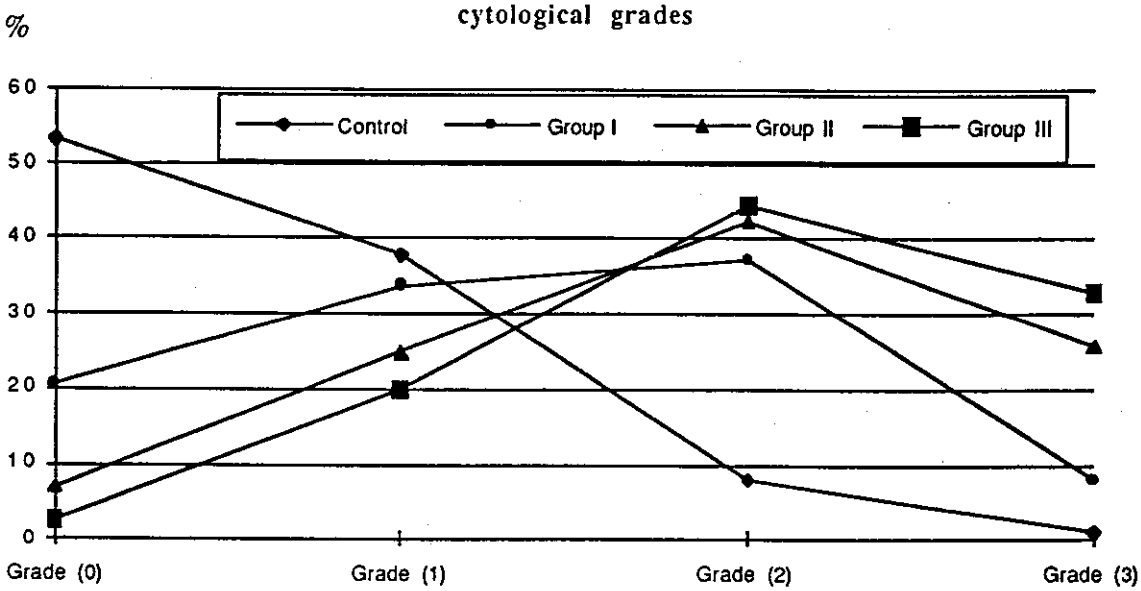


Table (20) and figure (31-II) show the effect of mode (daily or extended) of contact lens use on the development of pathological changes in conjunctiva, in comparison to the control group. This table shows that, there is a slight shifft of the cytological changes from grade 0 to grade 3 in eyes with extended wear contact lenses than eyes used the daily wear contact lenses. Statistically, this shifft is insignificant as $x2=6.81(P>0.05)$.

Figure (32-II) demonstrates that grade 2 cytological change is equally recorded in both D. and ex. groups with slight increase in grade 0 and 1 and decrease in grade 3 in D. group , if compared to ex. group.

Figur (33-II) demonstrates the different grades of cytological changes in the study cases totally and the normal control subjects. It shows that in control subjects, most of the specimens have grade 0 and grade l, little have grade 2, while grade 3 could be considered absent, as it is present in 0.8% of subjcets (Table 20).

Table (20) : Correlation between the mode of contact lens wear and the cytological grades.

Mode of use	Cytological grades								Total		X^2	P
	0		1		2		3					
	No.	%	No.	%	No.	%	No.	%	No.	%		
Daily	25	13.2	54	28.6	78	41.3	32	16.9	189	100		
extended	14	7.8	44	24.6	74	41.3	47	26.3	179	100	6.81	>0.05
Total	39	10.6	98	26.6	152	41.3	79	21.5	368	100		
Control	66	53.2	47	37.9	10	8.0	1.0	0.8	124	100		

Fig (31-II)A) Correlation between the mode of contact lens wear and the cytologicagrades

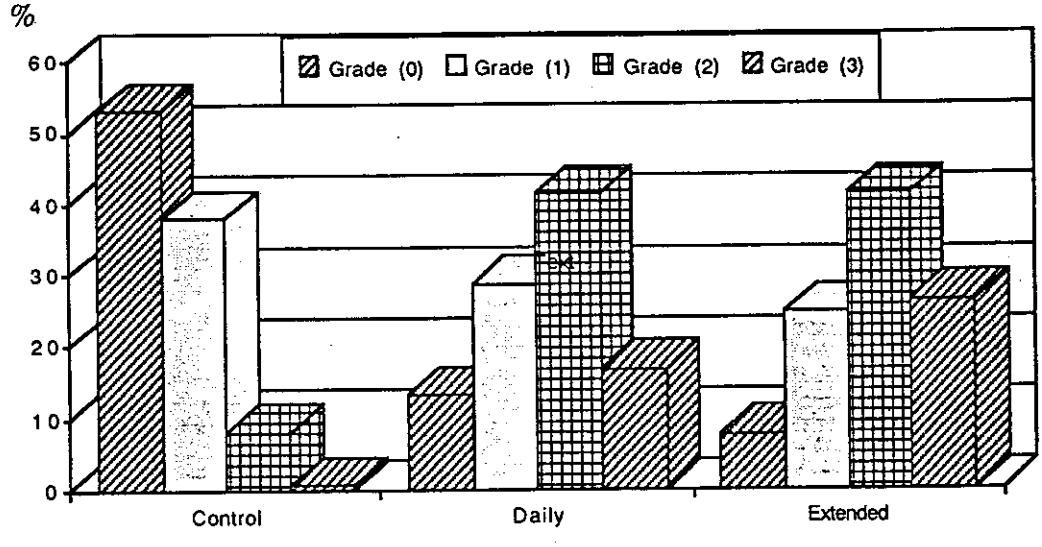


Fig (32-II) Correlation between the mode of contact lens wear and the cytological grades.

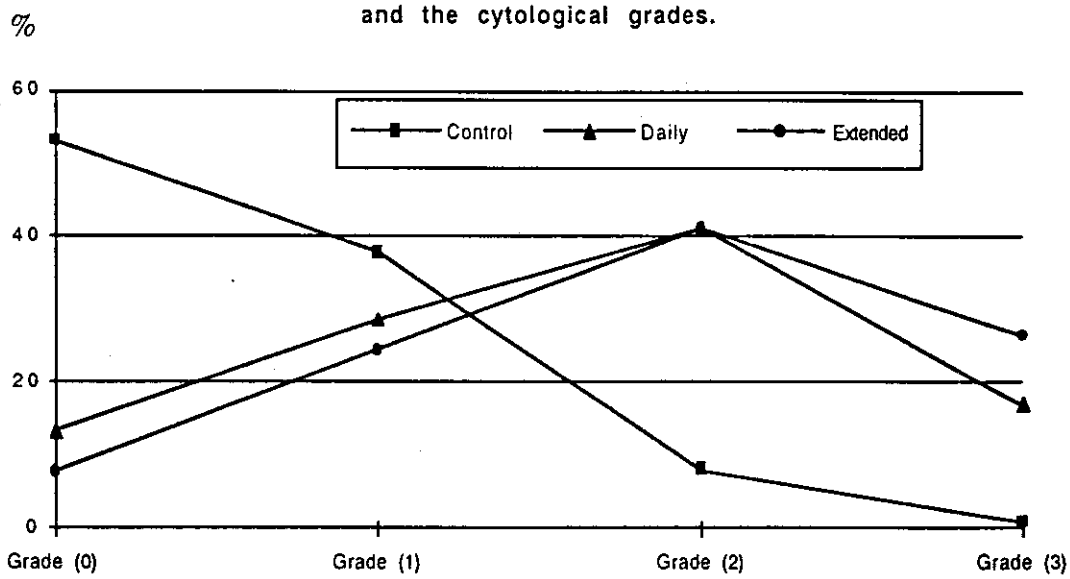
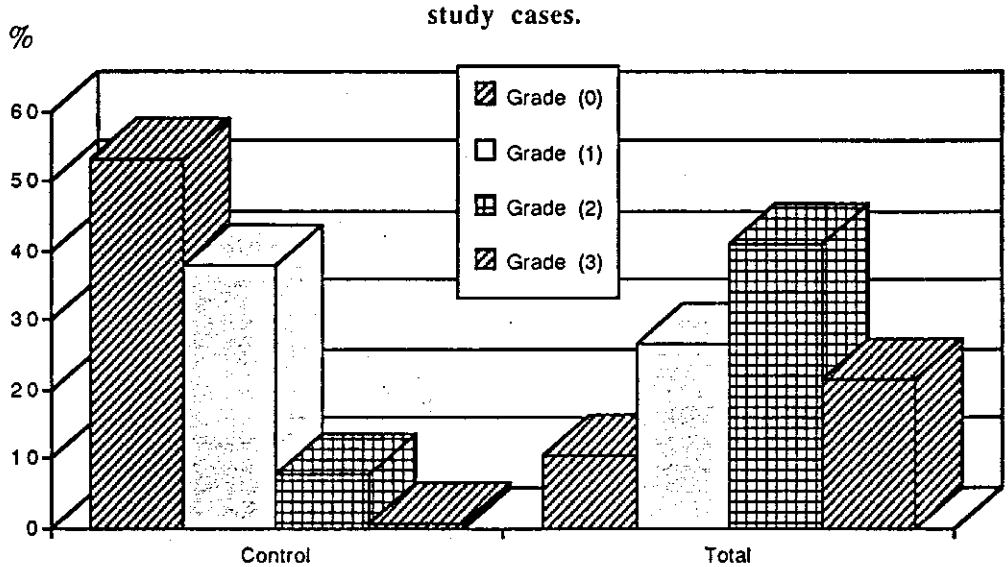


Fig (33-II) Comparison between the cytological grades in control and study cases.



Correlation between conjunctival appearance and cytological grades :

In table (21) and figure (34-II) the satin appearance of conjunctiva (normal conjunctiva) shows cytological grades 0 and 1 in both study and control subjects. the distribution of these grades in satin appearance is nearly equal in study and control subjects, as grade 0 is occured in 67.6% in study and 66% in control subjects, while grade 1 is occured in 32.4% and 34.0% in study and control subjects respectively.

This means that when contact lenses use does not produce clinical papillary changes of the conjunctiva (conjunctiva is still normal with satin appearance), histologial study of conjunctiva shows no difference from the conjunctiva of normal control subjects who had never worn contact lenses.

In uniform appearance of conjunctiva, there is a marked shift of cytological changes from grade 0 to grade 3 in study cases than in normal subjects. In study group 48.2% of uniform conjunctival appearance have grade 2 of cytological changes, 38.2% have grade 1, while grades 0 and 3 are present in 6% and 7.6% respectively. In controls, more than half of the uniform papillary appearance have grade 0, 50.7%, while 39.1% of them have grade 1 and 10.2% have grade 2. Grade 3 was not recorded in those control subjects have uniform appearance of conjunctiva.

In the non uniform appearance of conjunctiva, cytological grade 0 not detected in both study and control subjects. In study groups most of the cases have cytological grade 2 , 59.6% of subjects, while grade 3 occured in 23.6% of subjects and lastly grade 1 in 16.8% of subjects. On the other hand, in control group half of the subjects have cytological grade 1; 50% of subjects, while grade 2 and 3 are present in 37.5% and 12.5% of subjects respectively.

No giant papillary appearance was detected in control group.

Cases with giant papillary appearance of conjunctiva of the study groups show marked pathological changes as 95.2% of them have pathological change grade 3 and the rest , 4.8%, have grade 2. Grade 0 and grade 1 of cytological changes are not detected in the cases with giant papillary appearance.

This means that when the conjunctiva is normal (satin), there is no pathological difference between the study and control cases, but as the papillary changes of conjunctiva develop due to contact lens wearing, the conjunctiva shows marked pathological changes than conjunctiva of control subjects which has the same picture of papillary appearance.

Table (21) : Correlation between the conjunctival appearnace and the cytological grades in study and control groups.

Conj. Appearance	Group	No. of eyes	Cytological grades							
			0		1		2		3	
			No.	%	No.	%	No.	%	No.	%
Satin	study	43	29	67.6	14	32.4	---	---	---	---
	control	47	31	66	16	34	---	---	---	---
Uniform Papillae	study	169	10	6	65	38.2	81	48.2	13	7.6
	control	69	35	50.7	27	39.1	7	10.2	---	---
Non uniform Papillae	study	115	---	---	19	16.8	69	59.6	27	23.6
	control	8	---	---	4	50	3	37.5	1	12.5
Giant Papillae	study	41	---	---	---	---	2	4.8	39	95.2
	control	0	---	---	---	---	---	---	---	---

Fig (34-II)) Correlation between the conjunctival appearnace and the cytological grades in study and control groups.