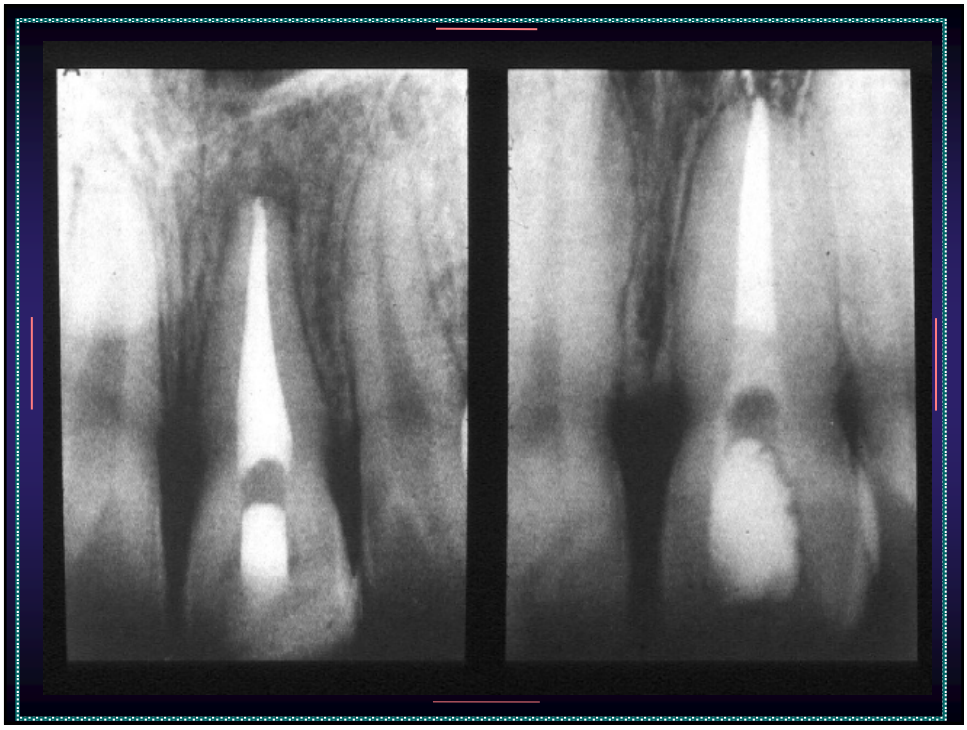
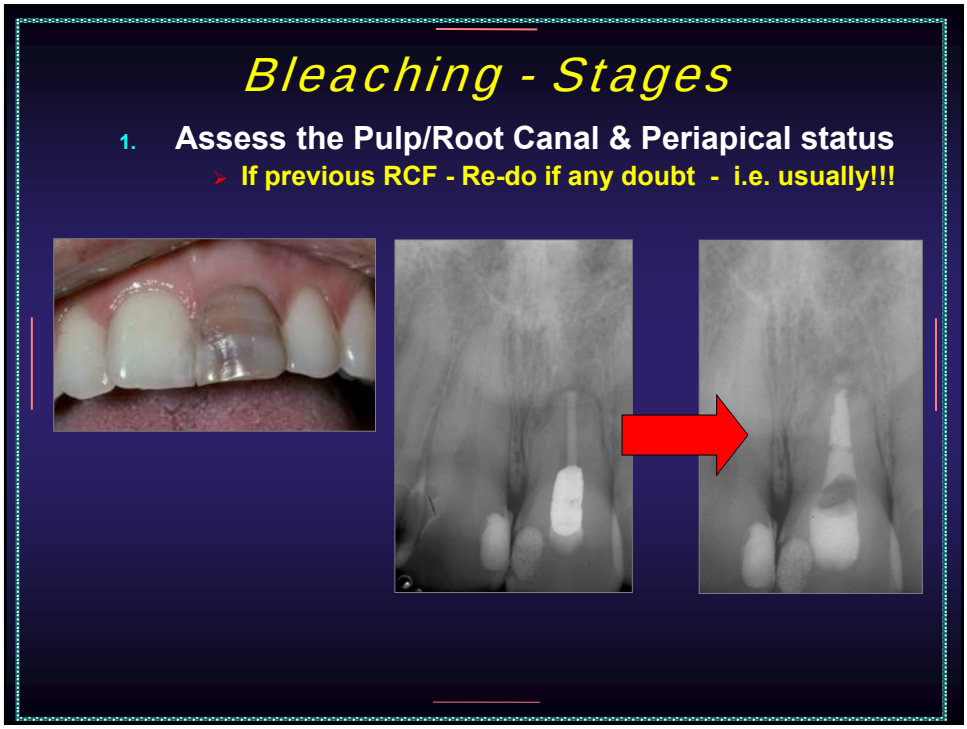
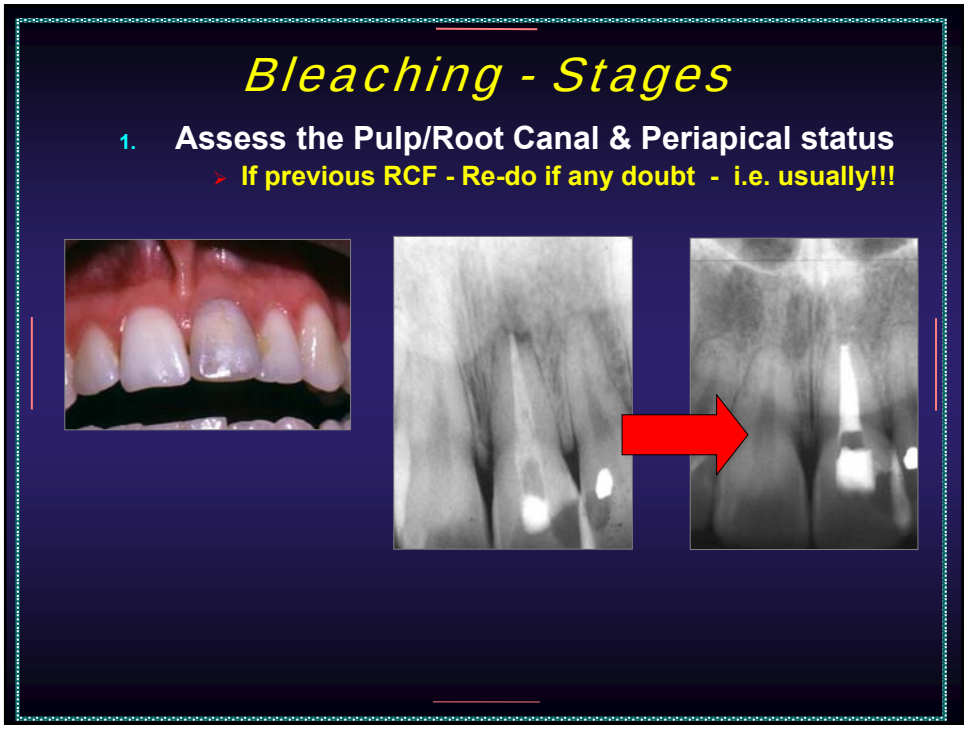


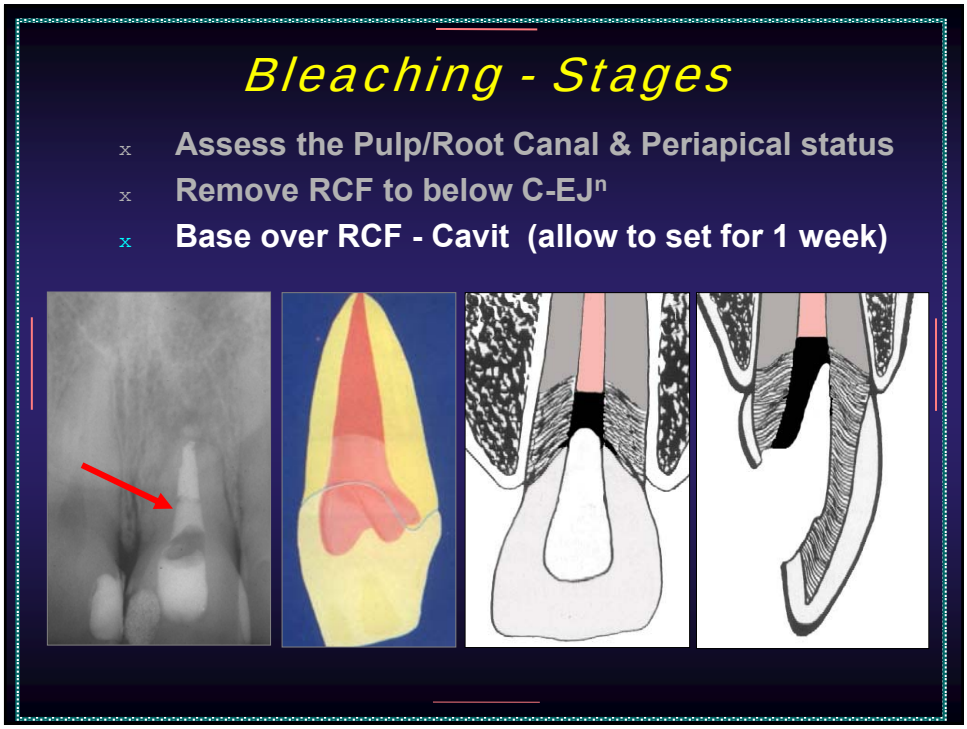
83


Bleaching - Stages
1. Assess the Pulp/Root Canal & Periapical status
If previous RCF - Re-do if any doubt - i.e. usually!!!

84


Bleaching - Stages
1. Assess the Pulp/Root Canal & Periapical status
If previous RCF - Re-do if any doubt - i.e. usually!!!

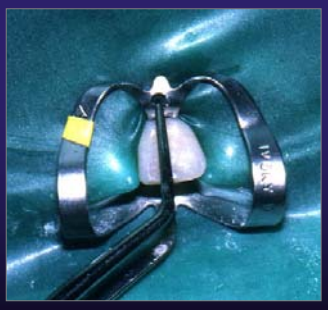
85


Bleaching - Stages
Assess the Pulp/Root Canal & Periapical status
Remove RCF to below C-EJn
Base over RCF - Cavit (allow to set for 1 week)

86

Bleaching - Stages

- Assess the Pulp/Root Canal & Periapical status
- Remove RCF to below C-EJⁿ
- Base over RCF - Cavit
- Rubber Dam; Access



87

Bleaching - Stages

- Assess the Pulp/Root Canal & Periapical status
- Remove RCF to below C-EJⁿ
- Base over RCF - Cavit
- Rubber Dam; Access
- Acid etch, wash & dry
  - HINT: Use a *LIQUID* acid etch solution

88

Bleaching - Stages

- Assess the Pulp/Root Canal & Periapical status
- Remove RCF to below C-EJ^{n}
- Base over RCF - Cavit
- Rubber Dam; Access
- Acid etch, wash & dry
- **Place thick paste of H_2O_2/Na Perborate**

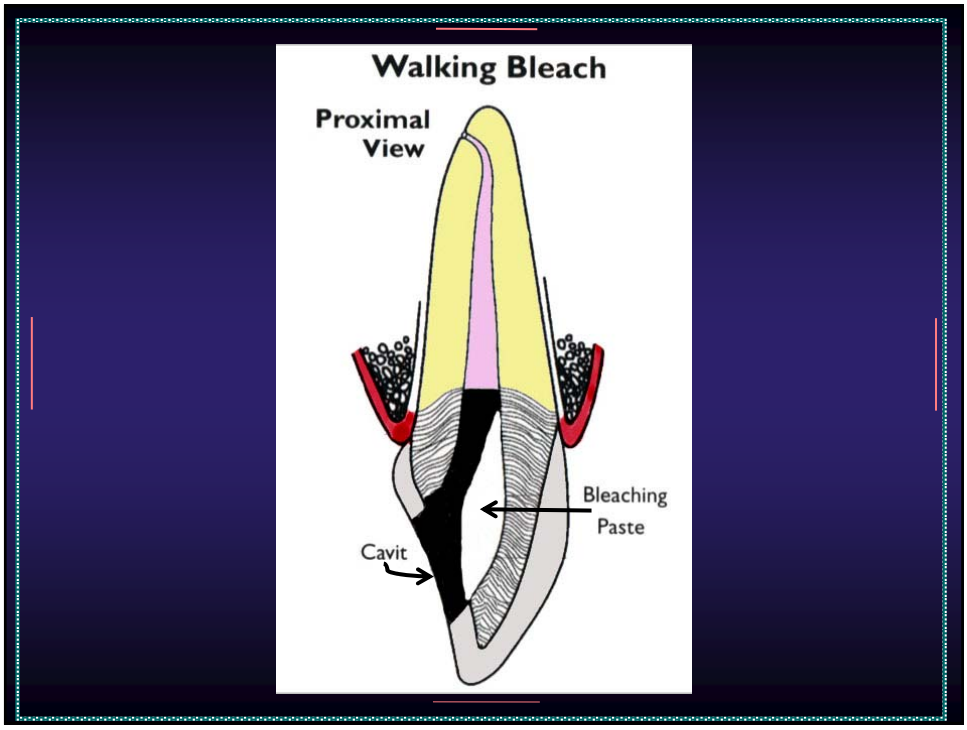


89

Bleaching - Stages

- Assess the Pulp/Root Canal & Periapical status
- Remove RCF to below C-EJ^{n}
- Base over RCF - Cavit
- Rubber Dam; Access
- Acid etch, wash & dry
- Place thick paste of H_2O_2/Na Perborate
- **Temporary filling - Cavit**

90



91

Bleaching - Stages

- Assess the Pulp/Root Canal & Periapical status
- Remove RCF to below C-EJ^{n}
- Base over RCF - Cavit
- Rubber Dam; Access
- Acid etch, wash & dry
- Place thick paste of H_2O_2/Na Perborate
- Temporary filling - Cavit
- **Review after 1 week**
- **Repeat if necessary**

92

Bleaching - Stages

- Assess the Pulp/Root Canal & Periapical status
- Remove RCF to below C-EJ^{n}
- Base over RCF - Cavit
- Rubber Dam; Access
- Acid etch, wash & dry
- Place thick paste of H_2O_2/Na Perborate
- Temporary filling - Cavit
- Review after 1 week
- Repeat if necessary
- **Restore access cavity**
  - **Temporary filling for minimum 2 weeks - Cavit**
  - **Then do GIC/composite**

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Restoration of Access Cavity

- **"Sandwich technique"**
  - **McLean J, *Br Dent J* 1988; 164: 293 - 300**

GIC - dentine replacement

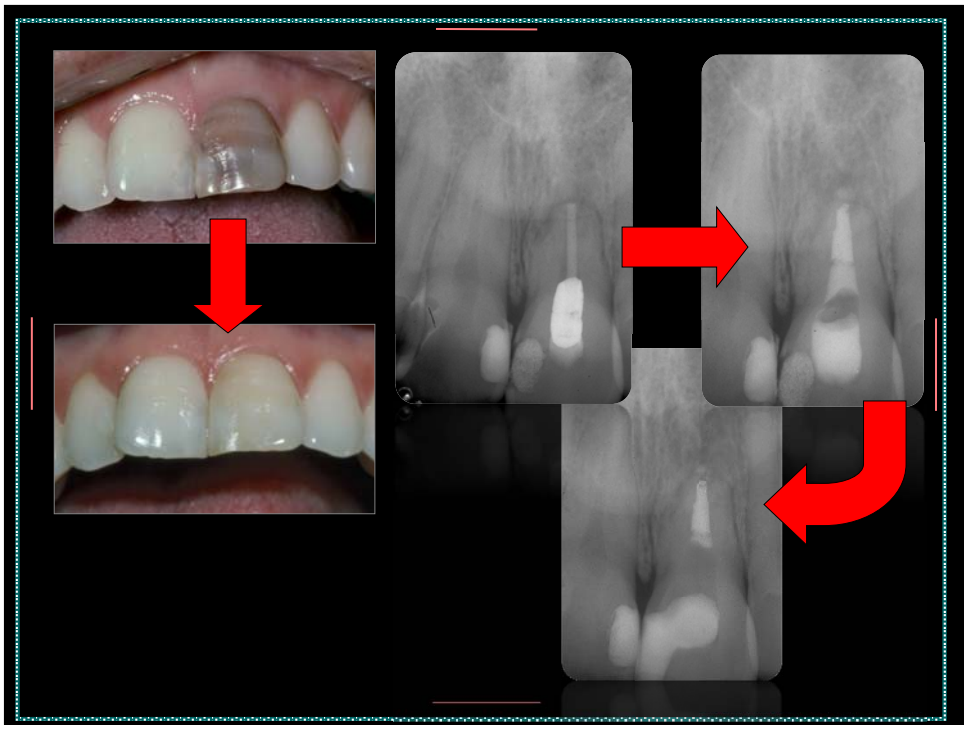
Composite resin - enamel replacement

94

Bleaching - Stages

- Assess the Pulp/Root Canal & Periapical status
- Remove RCF to below C-EJ^{n}
- Base over RCF - Cavit
- Rubber Dam; Access
- Acid etch, wash & dry
- Place thick paste of H_2O_2/Na Perborate
- Temporary filling - Cavit
- Review after 1 week
- Repeat if necessary
- Restore access cavity
- **Review - 6 mths, 2-3 yrs, etc**

95



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Internal Bleaching of Teeth

- An Analysis of 255 Teeth

Abbott PV, Heah S.

***Aust Dent J* 2009; 54: 326-333.**

98

Materials and Methods

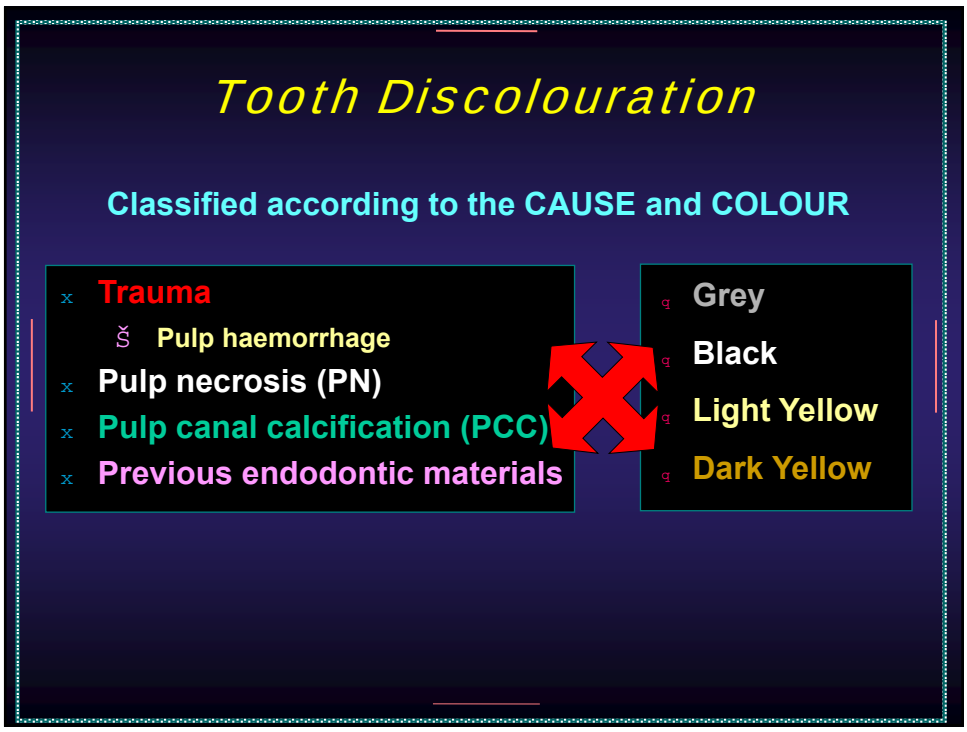
- 200 consecutive patients
- 255 teeth internally bleached
- Reviewed at regular intervals:
  - 6 months
  - Then annually up to 5 years
- Photographs taken on Kodachrome 35mm colour transparencies
- Patients (and parents) questioned about their perception of the colour changes
- Records and photographs reviewed

99

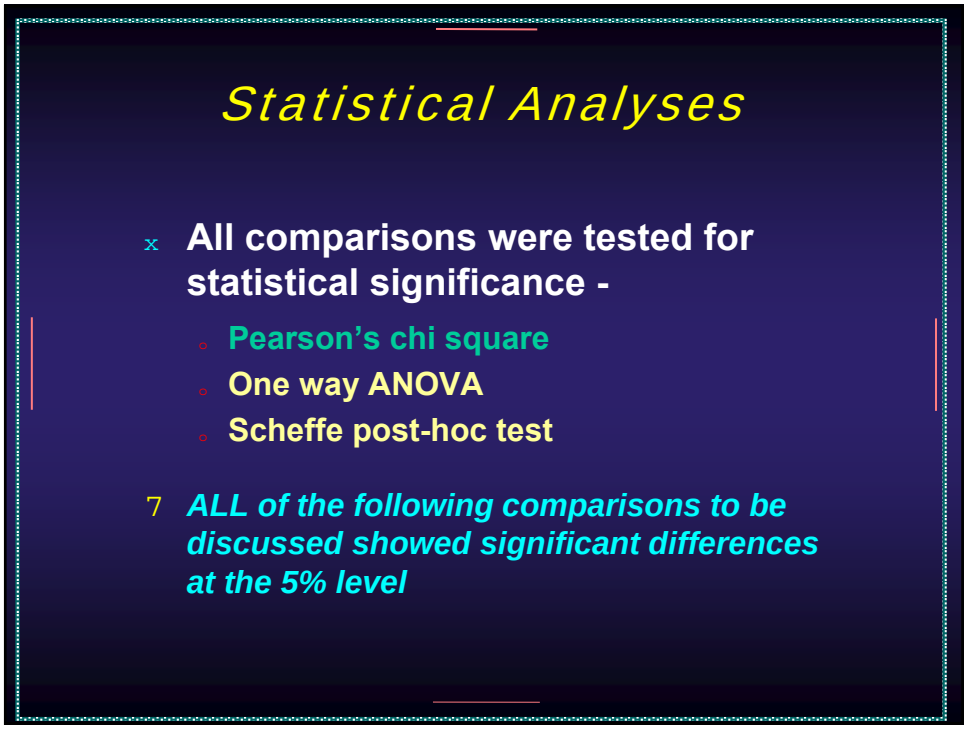
Factors Assessed

- Patient age, gender
- Tooth type
- Causative factors
- Original colour
- Initial outcome of bleaching
- Number of appointments required
- Colour stability
  - 6 months å yearly for 5 years
  - Factors related to subsequent changes
- Any subsequent treatment required
- Incidence of External Invasive Resorption

100


Tooth Discolouration
Classified according to the CAUSE and COLOUR
Trauma
Pulp haemorrhage
Pulp necrosis (PN)
Pulp canal calcification (PCC)
Previous endodontic materials
Grey
Black
Light Yellow
Dark Yellow

101


Statistical Analyses
All comparisons were tested for statistical significance -
Pearson's chi square
One way ANOVA
Scheffe post-hoc test
ALL of the following comparisons to be discussed showed significant differences at the 5% level

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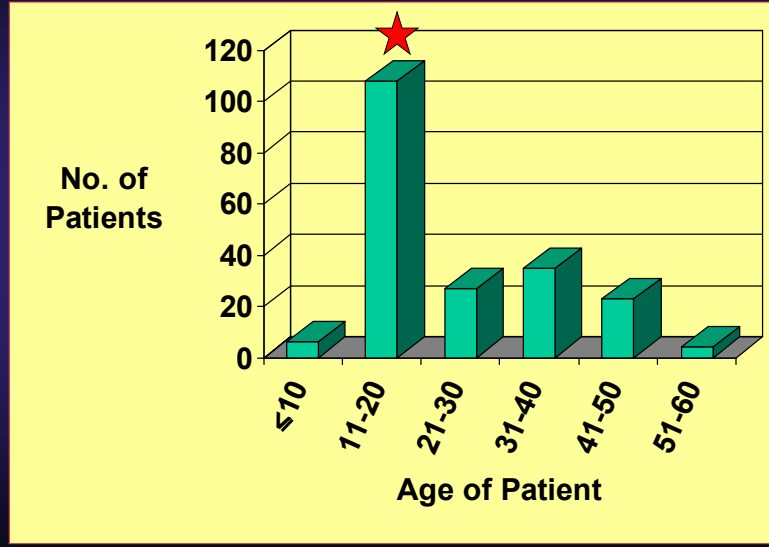
Results

	1 tooth	2 teeth	3 teeth	Total
Males	72	12	7	117 (46%)
Females	90	18	4	138 (54%)
Total	162	30	11	255 (100%)

More males than most studies due to higher incidence of trauma in boys than girls

103

Age Range



104

Tooth Type

Maxillary	Tooth	Mandibular
1 (0.4%)	1st Premolar	-
5 (2.0%)	Canine	-
52 (20.4%) ★	Lateral Incisor	4 (1.6%)
176 (69%) ★	Central Incisor	17 (6.6%)
234 (91.3%)	Totals	21 (8.2%)

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Colour -v- Cause

	Trauma	Previous Endo	PCC	Pulp Necrosis	Total
Dark Yellow	8.6 %	11.4 % ★	2.7 % ★	7.4 % ★	30.2 %
Light Yellow	15.3	3.9	0.8	3.1	23.1
Grey	26.7 ★	4.3	0	1.6	32.6
Black	8.2	4.3	0	1.6	14.1
Total	58.8	23.9	3.6	13.7	100

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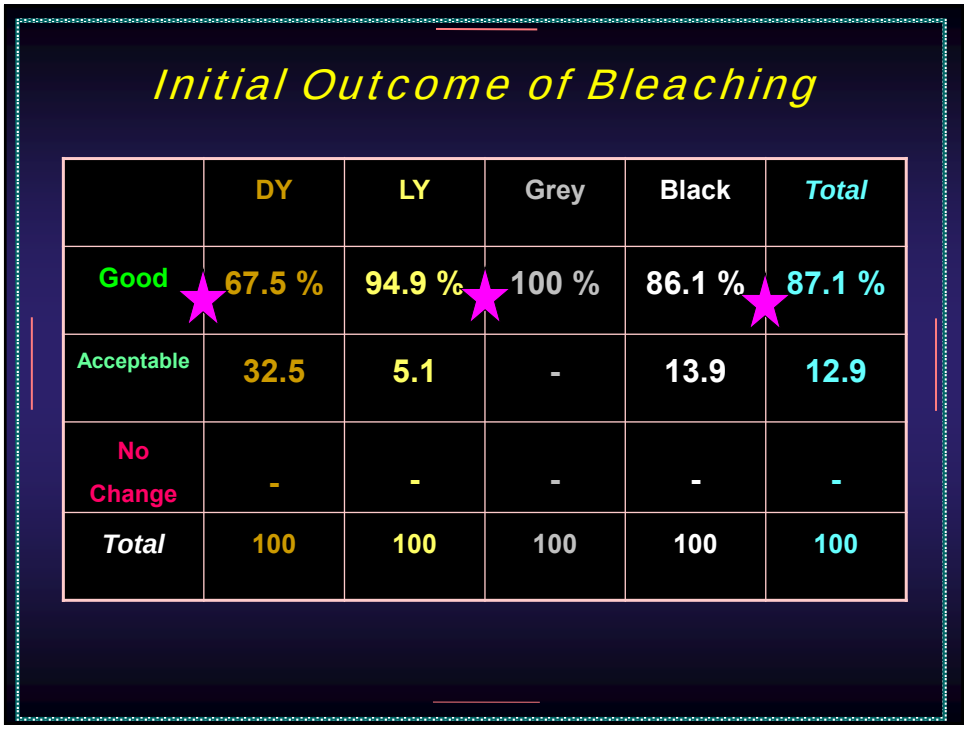
107



	DY	LY	Grey	Black	*Total*
Good	67.5 %	94.9 %	100 %	86.1 %	87.1 %
Acceptable	32.5	5.1	-	13.9	12.9
No Change	-	-	-	-	-
Total	100	100	100	100	100

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Outcome -v- Colour

- Predictability of outcome:
  - Grey (most predictable)
  - Light Yellow
  - Black
  - Dark Yellow (least predictable)

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Colour and Number of Applications of Bleach

No. of Applications	DY	LY	Grey	Black	Total
1	5.2 %	74.6 %	73.5 %	25.0 %	46.3 %
2	35.0	18.6	21.7	50.0	29.0
3	37.7	5.1	2.4	13.9	15.3
4	18.2	1.7	2.4	8.3	7.8
5	3.9	-	-	-	1.2
10	-	-	-	2.8	0.4

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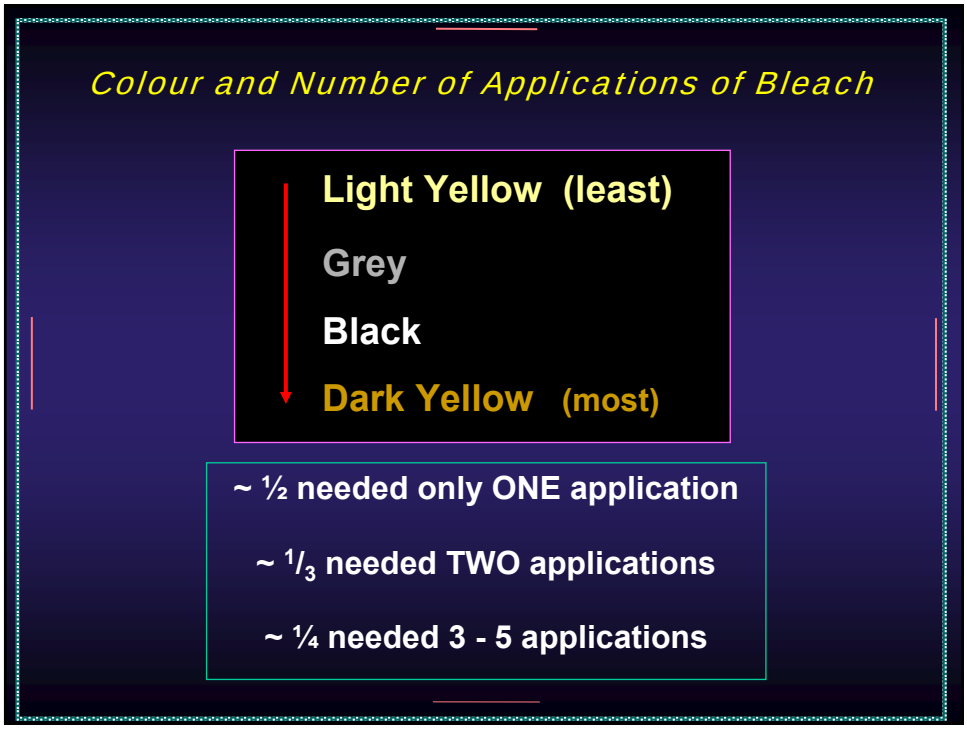
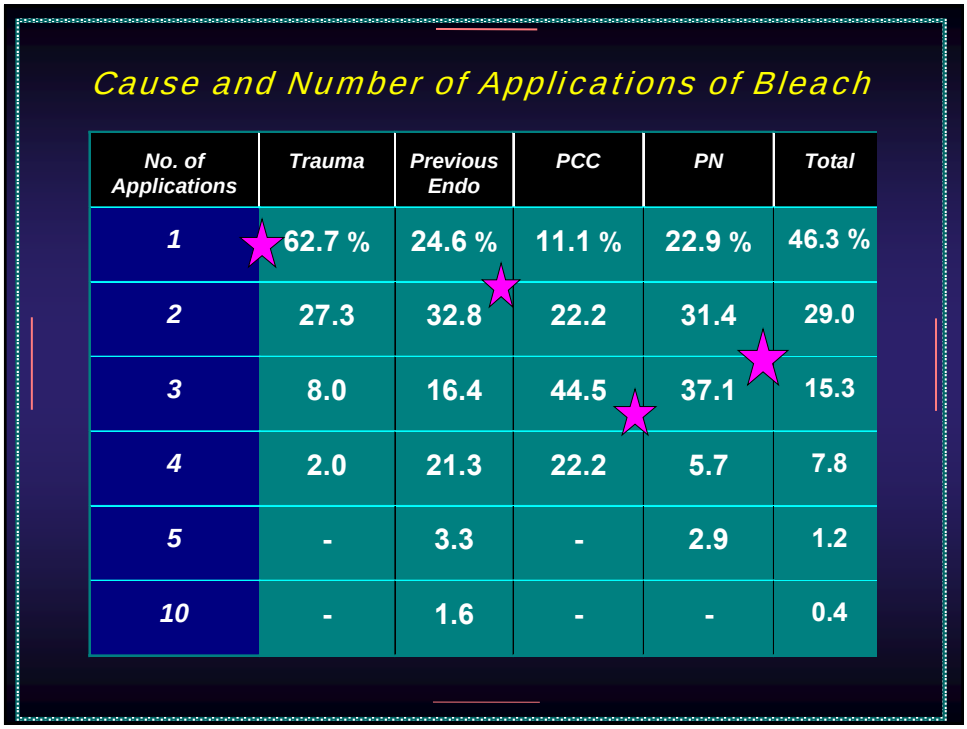


111



No. of Applications	Trauma	Previous Endo	PCC	PN	Total
1	62.7 %	24.6 %	11.1 %	22.9 %	46.3 %
2	27.3	32.8	22.2	31.4	29.0
3	8.0	16.4	44.5	37.1	15.3
4	2.0	21.3	22.2	5.7	7.8
5	-	3.3	-	2.9	1.2
10	-	1.6	-	-	0.4

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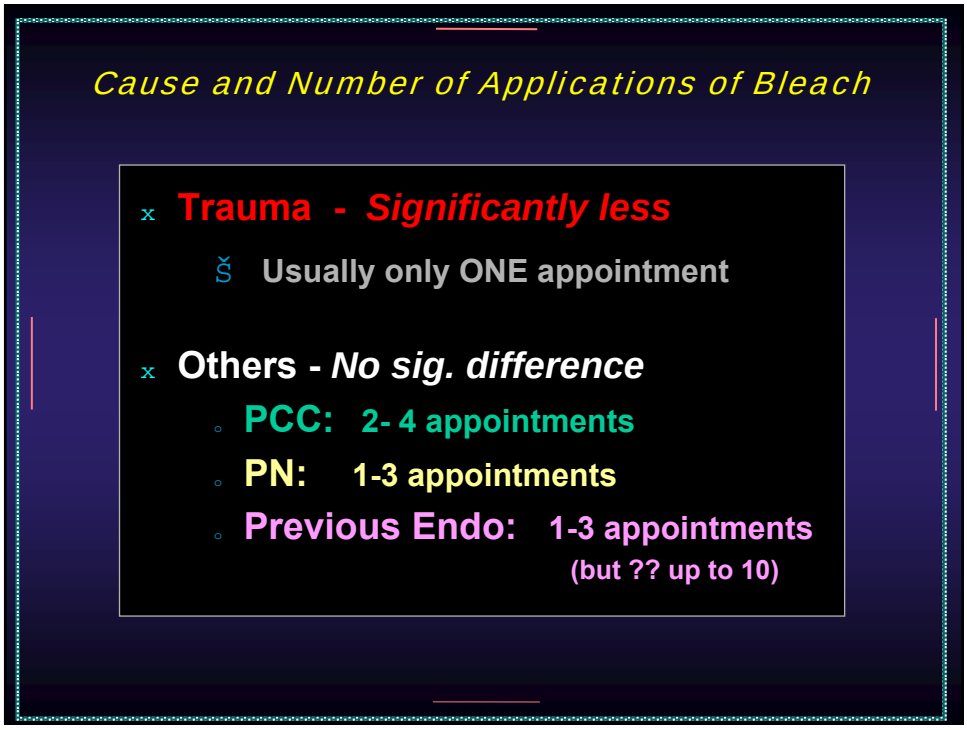
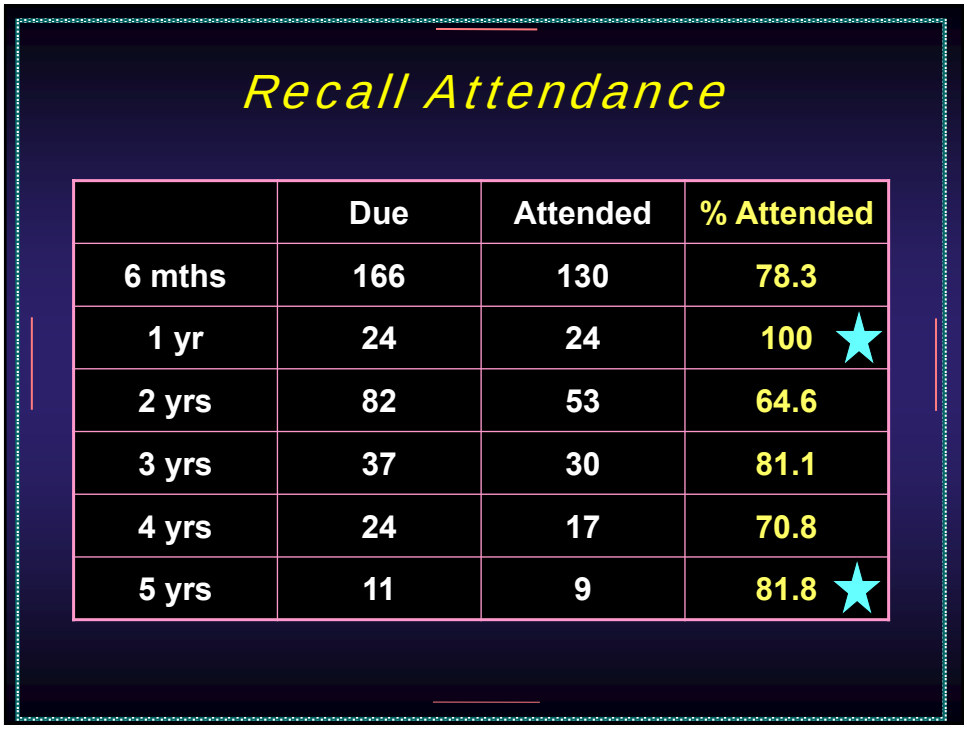


113



	Due	Attended	% Attended
6 mths	166	130	78.3
1 yr	24	24	100 ★
2 yrs	82	53	64.6
3 yrs	37	30	81.1
4 yrs	24	17	70.8
5 yrs	11	9	81.8 ★

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Colour Stability

Original Colour	Initial Result	Original No.	Acceptable Change	Discoloured
DY	Good	52	2 (3.8%) (2 yrs, 3 yrs)	2 (3.8%) (6 mths, 3 yrs)
DY	Acceptable	25	-	2 (8%) (6 mths, 1 yr)
LY	Good	56	1 (1.8%) (4 yrs)	-
LY	Acceptable	3	-	-

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Colour Stability

Original Colour	Initial Result	Original No.	Acceptable Change	Discoloured
BLACK	Good	31	-	1 (3%) (3 yrs)
BLACK	Acceptable	5	-	-
GREY	Good	83	1 (1.2%) (4 yrs)	1 (1.2%) (5 yrs)
GREY	Acceptable	-	-	-

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Colour Stability - Overall

- Acceptable Change - 4 teeth (1.6%)
  - 2 x DY, 1 x LY, 1 x Grey
- Discoloured - 6 teeth (2.4 %)
  - 2 x DY, 2 x LY, 1 x Black, 1 x Grey
- Total - 10 teeth (3.9%)

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Teeth Discoloured Again

- Still acceptable
  - 1 – 2 yrs:
  - 1 – 3 yrs:
  - 2 – 4 yrs:

  } unsatisfactory restorations
- Needed bleaching again
  - 2 – 6 mths: access not restored
  - 1 – 1 yr:
  - 2 – 3 yrs:
  - 1 – 5 yrs:

  } unsatisfactory restorations
- NB - Cotton wool found in ALL these cases

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Other Observations
Age was not related to the:
Cause
Colour
No. of appointments

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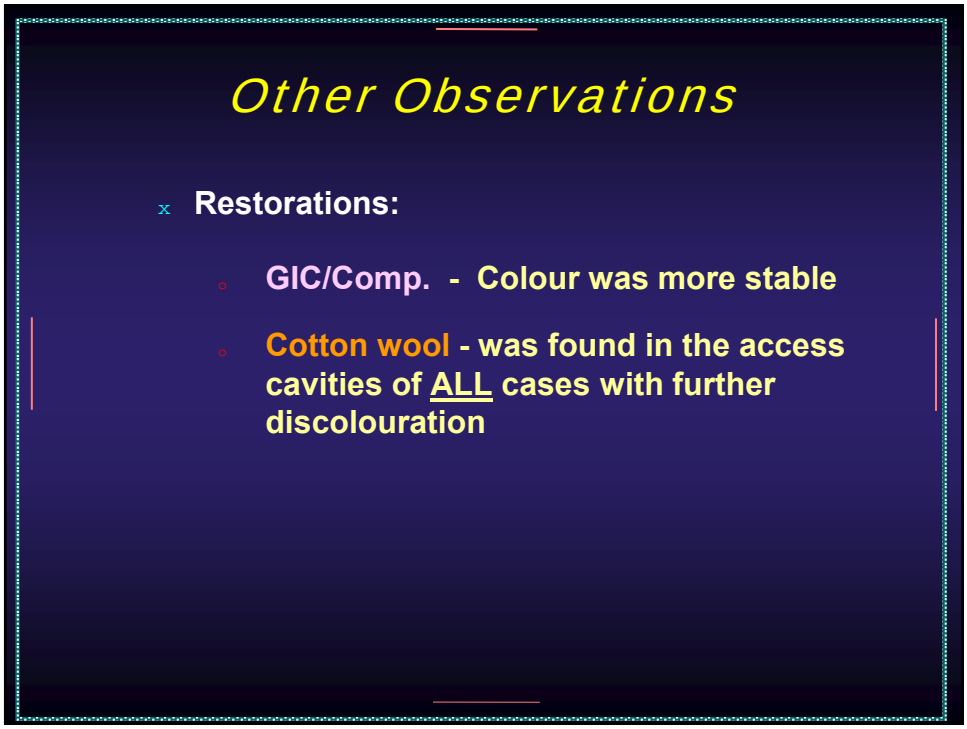
Other Observations
Restorations:
GIC/Comp. - Colour was more stable
Cotton wool - was found in the access cavities of ALL cases with further discolouration

120

Other Observations

- NO cases were found with External Invasive Resorption at any review appointments
  - Â 82% of cases reviewed for 5 years
- *But: ?? may need more time to assess*

121

Further Management Needed

- Re-bleached - 6 teeth
  - Restoration breakdown - as discussed
- Extraction - 5 teeth
  - Perio, HRF, VRF, C-RF, Repl. Res.
- Crowns - 4 teeth
  - Crown fractures
- Veneers - 3 teeth
  - One tooth too light
  - Two had old veneers replaced

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Conclusions from this Study

- Internal bleaching is a predictable procedure
- Initial colour change was usually "good"
  - The rest were "acceptable"
- Easier to bleach:
  - Teeth stained after trauma
  - Grey or Light yellow discolourations
- Darker teeth need more bleaching appointments
  - Dark yellow is the most difficult to bleach
  - Difficult to remove stains from previous RF materials
- Some teeth discolour again over 2-5 years
  - Appears to be related to breakdown of the restoration

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Overall Conclusions

- Internal bleaching - predictable, simple, quick, cheap
- Biologically cheap:
  - Conserves tooth structure
  - Maintain natural contour, form, function, occlusion
- Avoids potential problems of prostheses:
  - Periodontal problems, occlusion changes, use of posts, root fractures, opposing tooth wear, unnatural appearance, colour change of adjacent teeth with age, etc
- Safe if adequate precautions are taken
  - Essential to know and understand the chemistry of the materials and the procedural steps required

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