

Retinopathy

Significance of prepubertal diabetes duration for the development of retinopathy and nephropathy



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The prevalence and incidence of diabetic eye disease in adults is well-defined and the value of screening for diabetic retinopathy clearly established. Early detection of retinopathy and timely and appropriate laser photocoagulation is highly effective at preventing further visual deterioration. However, data in children is limited. Recommendations regarding the best time to initiate screening vary: at 5 years from diagnosis, at entry into puberty, at age 12 years, and, for patients over 9 years of age, at 3–5 years from diagnosis of diabetes. To date, these have mainly reflected consensus view rather than evidence-based data. It has been considered that while duration of diabetes is an important determinant of the presence of retinopathy in adults, duration prior to puberty has little, if any, effect. Since puberty can lie anywhere between ages 9–15, the mean age for puberty (around 11 years in girls and 12 years in boys) has been proposed. Determining the individual age of entry into puberty

requires accurate staging and would be difficult to introduce into a national screening programme.

Whilst a rise in growth hormone levels at the time of puberty may clearly accelerate the development of microvascular injury, can we really ignore the significance of prepubertal risk factors such as duration of diabetes, glycaemic control and blood pressure? As discussed in the paper by Olsen et al, conflicting evidence exists. Some reports suggest that prepubertal duration of diabetes and glycaemic control may contribute to the risk of developing microvascular injury and other studies demonstrate retinopathy in prepubertal children.

This paper describes a prospective, longitudinal study in children and adolescents with type I diabetes in Denmark and investigates the relative effect on development of retinopathy and nephropathy of pre- and postpubertal duration of diabetes. The authors show that prepubertal duration does contribute to the development of retinopathy, although not nephropathy, signifying a need to optimise blood control at all ages.

JOURNAL OF DIABETES AND ITS COMPLICATIONS

Diabetes-years before puberty associated with retinopathy

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 Albumin excretion rate (AER) and HbA_{1c} levels were investigated in ~80 % of Danish adolescents and children with diabetes in 1989; in 1995, 339 of the original group were restudied, of whom 303 had prepubertal onset of diabetes.

2 At follow-up, retinopathy was 17.7 %, 45.5 % and 67.6 % in those aged 12–15 years, 16–20 years and over 20 years, respectively.

3 Diabetic retinopathy was significantly associated with poor long-term metabolic control and to duration of diabetes in those with and without a prepubertal onset of diabetes, although pubertal diabetes duration contributed two times more than the prepubertal diabetes duration.

4 Mean postpubertal diabetes duration to any retinopathy was significantly shorter in those with prepubertal onset compared to those with postpubertal onset.

5 Elevated AER increased from 4 % in 1989 to 13 % in 1995; no patient aged under 15 years had elevated AER, but the prevalence was 14 % from those aged 15 years and older.

6 AER elevated in 1995 was significantly related to long-term metabolic control and elevated AER in the preceding years, but was not correlated to diabetes duration before or after the age of 12 years.

7 Prepubertal diabetes duration is significantly associated with the development of diabetic retinopathy, but the period contributes less compared to the years after puberty.

8 There was no association between raised AER and diabetes duration.

Olsen BS, Sjølie AK, Hougaard P et al (2004) The significance of the prepubertal diabetes duration for the development of retinopathy and neuropathy in patients with type 1 diabetes. *Journal of Diabetes and its Complications* **18**: 160–64

ARCHIVES OF OPHTHALMOLOGY

Diabetic retinopathy affects millions of US adults

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓

1 This study aimed to determine the prevalence of diabetic neuropathy in adults aged ≥40 years in the US.

2 Data from eight population-based eye surveys were used to estimate the prevalence of retinopathy and vision-threatening retinopathy in people with diabetes.

3 In an estimated 10.2 million US adults with diabetes aged ≥40 years, the estimated prevalence rates

for retinopathy and vision-threatening retinopathy were 40.3% and 8.2%, respectively.

4 The US general population prevalence rates for retinopathy and vision-threatening retinopathy were estimated to be 3.4% and 0.75%, respectively.

5 Approximately 4.1 million adults aged ≥40 years in the US have diabetic retinopathy, and 1 in 12 people with diabetes aged ≥40 years has advanced vision threatening retinopathy.

6 Due to the ageing US population and increasing prevalence of diabetes, future projections suggest that diabetic retinopathy will increase as a public health problem.

The Eye Diseases Prevalence Research Group (2004) The Prevalence of Diabetic Neuropathy Among Adults in the United States. *Archives of Ophthalmology* **122**: 552–563

ACTA OPHTHALMOLOGICA SCANDINAVICA

Handheld digital videocameras do not fulfil needs

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓

- 1 This study assessed three novel digital fundus cameras for diabetic retinopathy screening.
- 2 Images (427) were captured using digital colour and red-free retinal imaging of 70 people with diabetes and controls.
- 3 The images were graded for diabetic retinopathy by three readers.
- 4 Digital 50° red-free imaging had sensitivity of 97.7%, two-field 50° colour imaging 94% and two-field 45° colour imaging sensitivity of 88.9%.
- 5 The hand-held digital colour videocamera showed a sensitivity of 6.9% and ungradeable images constituted 92.3%.
- 6 Digital 50° red-free and two-field 50° or 45° colour imaging were suitable for diabetic retinopathy screening, but the hand-held digital videocamera did not fulfil the needs.

Saari JM, Summanen P, Kivela T, Matti Saari K (2004) Sensitivity and specificity of digital retinal images in grading diabetic retinopathy. *Acta Ophthalmologica Scandinavica* **82**: 126–30

ARCHIVES OF OPHTHALMOLOGY

OCT more effective for detecting mild foveal thickening

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓

- 1 This study compared optical coherence tomography (OCT) with lens biomicroscopy for the detection of diabetic foveal oedema.
- 2 Participants comprised a cohort of people with diabetes seen at a US-based retinal vascular centre.
- 3 Oedema involving the centre of the macula was assessed as

DIABETIC MEDICINE

Screening schemes: low impact on retinal examinations

Readability	✓✓
Applicability to practice	✓✓✓
WOW! factor	✓

- 1 This study assessed the proportion of people with diabetes who are screened for retinopathy according to the provision of screening services.
- 2 A total of 25 health authorities in England and Wales were sampled after stratification by type of screening provision for diabetic retinopathy.
- 3 Six health authorities had an optometry scheme, six had a camera scheme, four had mixed schemes and nine did not have a population-based screening scheme.
- 4 The proportion of people with one or more retinal examination by an expert in the last year was 44.7% where there was no screening scheme, and 62.2%, 59.4% and 61.6%, respectively, where optometry, camera and mixed schemes were present.
- 5 The results showed that screening schemes have had a higher impact on the coverage of examinations performed by experts, but small impact on overall retinal examinations.

Wilson A, Baker R, Thompson J, Grimshaw G (2004) Coverage in screening for diabetic retinopathy according to screening provision: results from a national survey in England and Wales. *Diabetic Medicine* **21**: 271–78

definitely present, questionably present, or definitely not present.

- 4 A total of 172 eyes of 95 people with diabetes were examined
- 5 Excellent agreement was found between OCT and contact lens examination for the presence or absence of foveal oedema when OCT thickness was normal or moderately to severely increased; agreement was poor when foveal thickness was mildly increased on OCT.
- 5 Contact lens biomicroscopy may be relatively insensitive for the detection of mild foveal thickening apparent on OCT.

Brown JC, Solomon SD, Bressler SB et al (2004) Detection of diabetic foveal edema. *Archives of Ophthalmology* **122**: 330–35

AMERICAN JOURNAL OF OPHTHALMOLOGY

The benefits of tritan contrast threshold test

Readability	✓✓✓
Applicability to practice	✓✓
WOW! factor	✓✓

- 1 The objective of this prospective comparative study was to compare tritan contrast threshold (TCT) with fundus photography in screening for sight threatening diabetic retinopathy (STDR) before significant loss of vision.
- 2 Participants comprised a total of 510 people with diabetes attending a hospital-based photographic screening clinic over a period of 2 years. Patients were excluded from study for a number of reasons, including vision worse than 6/9, glaucoma and significant media opacity.
- 3 Retinal photography was performed using a polaroid mydriatic fundus camera with a 45° field.
- 6 The TCT test and the fundus photography were significantly correlated with the presence of STDR.
- 7 The TCT test gave a specificity of 95% and a sensitivity of 94% for detection of STDR compared with a specificity of 95% and a sensitivity of 88% with fundus photography.

8 Results suggested that combined modality improved the overall screening performance.

9 In comparison with fundus photography, the TCT test is both a clinically viable and effective technique to screen for STDR in people with diabetes; combining the TCT test and fundus photography increases the performance of screening for STDR. However, the results of the study are not applicable to population-wide screening.

Ong GL, Ripley LG, Newsom RS (2004) Screening for sight-threatening retinopathy: comparison of fundus photography with automated color contrast. *American Journal of Ophthalmology* **137**: 445–452

‘Screening schemes have had a higher impact on the coverage of examinations performed by experts, but small impact on overall retinal examinations’

‘Combining the tritan contrast threshold test and fundus photography increases the performance of screening for sight threatening diabetic retinopathy’