

FC2

May 2016

Updated to include apparently incorrect refraction results from
10/02/2016

The ^{2nd} Fuzzy Cellan Report

Tim Rickman's first cataract operation (on his right eye) worked well, resulting in a fixed spherical focus near infinity as planned, with almost the same small amount of cylindrical error as had existed before the operation.

The second operation (on his left eye) should also have resulted in fixed spherical focus near infinity. To try to achieve this, the shape of the artificial lens for implant was calculated based on the hospital's measurements of the left eyeball together with the most recent optician's prescription. However, after the operation the left eye's fixed spherical focus was found to be less than one metre. Something had gone wrong. The hospital said it had done nothing incorrect, but the record of prescription data provided by the optician provided some explanation of how this wrong outcome occurred.

Tester	Date	x	Right	Right	Right	Right	Left	Left	Left	Left
			Sphere	Cylinder	S+C/2	Axis	Sphere	Cylinder	S+C/2	Axis
L1?	25/10/00	1	0.25	-0.75	-0.13	110	0.5	-0.75	0.13	60
L2?	20/10/00	2	0.25	-0.75	-0.13	110	0.5	-0.75	0.13	60
B	04/11/09	3	0.75	-1.25	0.125	100	-0.25	-1.75	-1.13	92
N	30/11/12	4	0.5	-1	0	110	-0.75	-0.75	-1.13	70
L2	11/07/14	5	0.25	-0.5	0	110	0	-1.75	-0.88	92
L1	10/02/16	6	0.25	-0.5	0	100	-1.75	-0.75	-2.13	100
A	20/04/16	7	0.25	-0.5	0	100	-1	-1	-1.5	80

Table 1: Tim's eye refraction results from various testers over time.

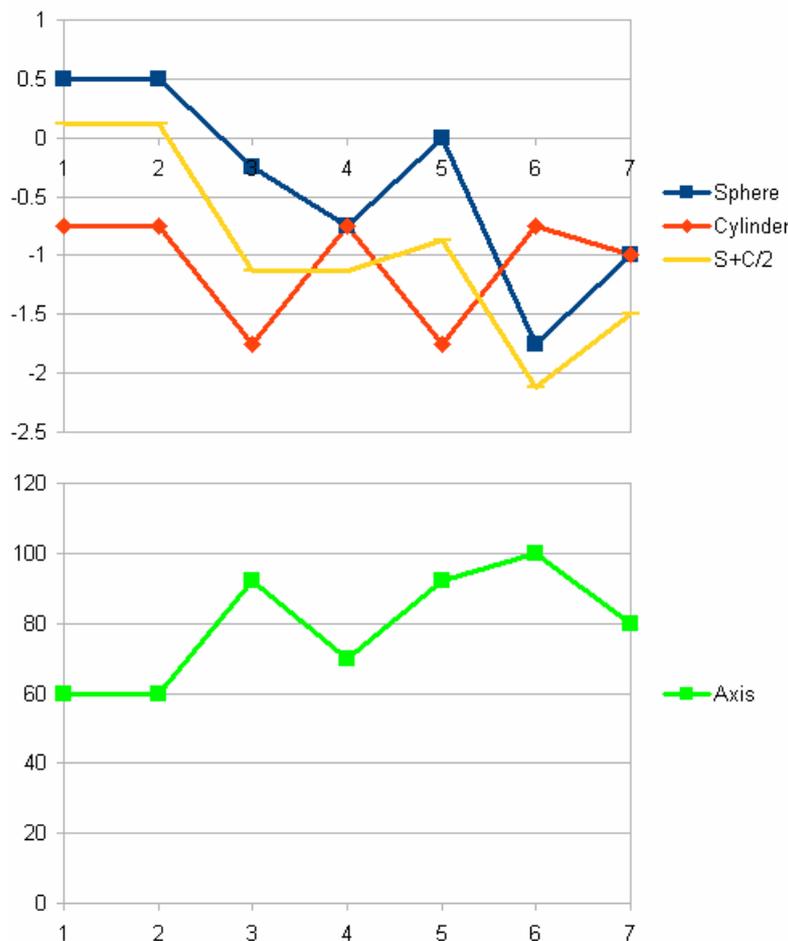


Chart 1: Tim's left eye refraction results from various testers over time (x axis not linear).

MAIN POINTS:

Test 3, 5 and 6 results appear mostly wrong.

Test 5 results appear mostly to be a copy of test 3 and previous results.

Test 2 results are also exactly the same as test 1 results.

Ignoring results from tests 3, 5 and 6, trends are smooth towards the final value.

Cataract operation took place after test 5. (It seems likely that no focus correction was intended in the operation.)

Explanation

Over the years, several different optician practices had carried out refraction eye tests on Tim's eyes, and within one practice two different people had carried out refraction tests on separate occasions.

Test 1. The results from refraction test number 1 are unremarkable and presumably correct.

Test 2. Refraction test number 2 was carried out by a tester L2 who had access to the results of the previous test. Its refraction results were exactly the same in every respect as those from the previous test performed by a different tester at the same practice, implying no change at all in either eye in the intervening period.

Test 3. The results from refraction test number 3 (carried out without access to any previous results) were rather surprising, showing greatly increased cylindrical error in the left eye at a changed and very precisely stated axis (92 degrees). As it happened, the spectacles made up from this prescription (by a different optician, I think) were hardly ever used, and for several years Tim instead used cheap over-the-counter reading glasses which proved adequate despite their providing no cylindrical correction.

Test 4. Refraction test number 4, carried out by yet another optician (without access to previous results) provided less extreme results which implied that the surprising results from the immediately preceding test were incorrect. Specifically, it appeared that in the left eye the previously recorded large increase in cylindrical error had never occurred. However, viewed in retrospect, there were slight early signs of a slow increase in both left axis and in left negative spherical error.

Test 5. Refraction test number 5 was carried out by L2 (who again had access to previous test results, with the exception of the apparently correct results from test 4). While the right eye results seem correct, the test results for the left eye show a great resemblance to the somewhat discredited extreme results from test 3. Not only has the large cylindrical error reappeared, but its axis has moved back to *exactly* 92 degrees. (For small cylindrical error, opticians seem to usually state axis error only in multiples of ten.) The figure for left spherical error is given as infinity (zero) which is intermediate between the various previous results to which L2 had access. In fact, I believe at that point the true figure for left cylinder error was that unchangingly identified by every previous test except the wayward test 3, and the true figure for left spherical error was somewhere between minus 0.75 and minus 1 having followed the trend apparent in previous tests. However, it was L2's results which were provided to the hospital and used to calculate the shape of the left eye implant. At the time of this test, Tim was under the impression the results would be unimportant because the lens being measured was to be removed anyway. No doubt he implied to L2 that this was the case.

Test 6. After the left eye operation, refraction test 6 (carried out with access to previous results) showed an extreme value for left sphere. The left cylindrical error was recorded as unchanged from the value provided by the same tester (L1) many years earlier.

Test 7. When it became apparent that test 6 was wrong, another refraction test (test 7) was carried out by a different optician. This indicated that tests 3, 5 and 6 had all been incorrect for the left eye. The figure now determined for left spherical error suggested that, based on L2's zero error result from refraction test 5, the hospital had not known it was necessary to provide any sphere correction and so had left considerable spherical error in place by faithfully reproducing it in the implant.

Conclusions

Tester B: The results recorded for the left eye by tester B were clearly far from correct.

Tester L2: It appears that on some occasions, even with access to previous refraction test results, L2 has the skills necessary to correctly carry out refraction tests on eyes without cataracts. However, when cataracts were present, there were indications of L2's results being based largely or entirely on records of previous test results by other testers. In one case, L2 appears to have relied on previous results from another practice which were several years old and very incorrect. This seems to have resulted in a cataract operation which provided inappropriate focus. It could as easily have been much worse and provided even worse focus or no focus at all. It therefore seems likely that L2 would benefit from improved training or a review of adopted procedures.

Tester L1: The apparently incorrect results from test 6 suggest that, even when no cataract is present, L1 also cannot be relied on to carry out refraction tests correctly nor to adequately check on the work of less experienced testers at the same practice.

Tester N: Despite the presence of cataracts, Tester N (at a branch of SpecSavers) seemed to have no difficulty in performing the refraction test.

Tester A: Tester A (at a branch of Vision Express) also seemed to have no difficulty in performing the refraction test.

Tim Rickman, May 2016.