Posterolateral lumbar fusion

Outcome of 71 consecutive operations after 4 (2–7) years

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We report the outcome of 71 consecutive posterolateral lumbar fusions without spinal instrumentation. The indication for the operation was spondylolysis-olisthesis, degenerative disc disease/facet joint arthrosis, or pain after prior laminectomy.

Concerning pain relief, 29/43 patients with spondylolysis-olisthesis were classified as good. The corresponding figures in the group with degenerative disc disease and/or facet joint arthrosis were 8/16 patients and in the group with pain post-laminectomy, 6/12 patients. No surgical complications were noted.

In the total material 54 patients had a solid fusion, as defined by radiographic osseous trabecular bridging at all intended levels. One-level fusions tended to heal solidly in a higher frequency than two-level fusions. For the spondylolysis-olisthesis group, healed fusion correlated with a good clinical result. Such a correlation could not be verified for the other diagnostic groups.

We conclude that non-instrumented posterolateral lumbar fusion is a valid method for treating low-grade spondylolysis-olisthesis, especially when the aim is to fuse a single level. Improved patient selection methods are required in fusion for degenerative disc disease and pain after laminectomy.

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The question as to when, how and even whether segmental spinal pain and painful mobility/hypermobility should be treated by fusing limited spinal segments is still controversial (Nachemson 1985). Results concerning the pain-relieving effect and radiographic fusion solidity have been variable and in many reports no clear correlation has been shown between the two parameters (Kabins et al. 1992, O'Beirne et al. 1992).

Lumbar fusion can be performed with posterior, posterolateral or intercorporeal technique, achieving different and variable frequencies of solid fusion. Posterior technique gives poor stability (Lee and Langrana 1984). The incidence of complications for the posterolateral fusion is low, while serious and more frequent complications have been reported with the intercorporeal technique (Stauffer and Coventry 1972a). In our study, the posterolateral technique was evaluated by reviewing a series of consecutive primary fusions, irrespective of the preoperative diagnosis.

Patients and methods

During the period 1984–1989, 71 posterolateral fusions without laminectomy and without internal fixation were performed on 43 men and 28 women who had no prior spinal fusion (General Table). The mean age at operation was 37 (11–67) years.

The diagnoses were spondylolysis-olisthesis in 43 cases (41 with low-grade slip and 2 with high-grade slip exceeding 50 percent), degenerative disc disease and/or facet joint arthrosis in 16 cases, and pain post-laminectomy/ decompression in 12 cases.

The indication for the operation was long-standing, intractable lumbar pain and/or radiating pain correlated to lumbar motions and with no pain relief using conservative measures. 70 patients had lumbar pain. The mean preoperative duration was 4 (1–20) years. 59 patients had radiating pain of some degree, 37 of them belonging to the spondylolysis-olisthesis group.

All 71 patients were evaluated in this follow-up, 61 by a physical and a radiographic examination. One man with spondylolysis-olisthesis grade II, now lives abroad and therefore participated only by completing a questionnaire. 9 patients were, by the time

of follow-up, already operated on, with a refusion due to pseudarthrosis with persistent pain.

Surgery

All patients had a bilateral non-instrumented posterolateral fusion without laminectomy, using cancellous autogenic bone transplant from the iliac crest. Spondylolisthetic vertebrae were fused in situ. 38 fusions were performed between L5 and S1, 29 between L4 and S1 and 4 on other levels. The quota of one-level/two-level fusions was 25/18 in the spondylolysis-olisthesis group, 10/6 in the degenerative group and 7/5 for the patients with pain post-laminectomy. 5 experienced spinal surgeons participated and performed all the operations.

No surgical or postoperative complications were recorded. All patients were instructed to keep the trunk straight and to use a rigid lumbar orthosis for a minimum of three months postoperatively.

Clinical examination and evaluation

The mean follow-up time was 3.5 (2–7) years. The clinical examination was performed by an orthopedic surgeon who had not participated in the prior treatment of the patients. Relief of back pain and leg pain was graded by the patient into three categories: good (minor or no residual pain), fair (some pain relief but residual pain) and poor (unchanged or worse compared to preoperatively). In line with former publications on the subject (Stauffer and Coventry 1972b, Johnson et al. 1988), we excluded the term "excellent" in the clinical evaluation. The need for analgesics was recorded as daily and regular, infrequent or non-existent. Type of preoperative work, ability to return to the same or less strenuous work after the operation and definitive disability pension for back pain were recorded.

The physical examination included Schober's (1937) skin distraction test for lumbar mobility, which has proven repeatable (Gill et al. 1988), straight leg raising test and a conventional neurologic examination of the lower extremities.

Radiography

Routine anteroposterior and lateral radiographs were obtained with the patient supine. These and the preoperative radiographs were assessed by a radiologist without knowledge of the clinical outcome. All intended fusion levels were evaluated bilaterally concerning solidity. The fusion was considered solid when osseous trabecular bridging could be verified on all intended sites.

Disc height in the fused levels and the level proximal to the fusion were assessed and classified semi-quantitatively into 4 groups: normal disc height, disc height decreased by less than 50 percent, disc height decreased by at least 50 percent and disc height obliterated (Pope et al. 1977, Saraste et al. 1985).

Slip was measured in relation to the anteroposterior diameter of the slipped vertebra inferiorly, according to the method described by Boxall et al. (1979). High grade slip was defined as a slip >50 percent. A difference in relative slip value less than 20 percent between preoperative radiographs and follow-up radiographs was not considered significant (Danielson et al. 1988, 1989).

Statistics

For statistical analysis the chi-square test was used.

Results

The mean lumbar mobility was 3.1 (0–6) cm in the group with a poor clinical outcome regarding relief of back pain. With a fair result the corresponding figures were 3.6 (1–6) cm and with a good result the mean mobility increased to 4.7 (2–8) cm.

At follow-up, 33/62 patients reported radiating pain of some degree but using the straight leg raising test, radiating pain was elicited in only 12/61 patients. No neurologic disturbances were observed.

54 patients had a solid fusion and 16 had a pseudarthrosis or incomplete fusion (Table 1). For the total material, a good clinical result correlated with the presence of solid fusion (P 0.0001) (Table 2). One-level fusions tended to heal solidly (35/41 patients) in a higher frequency than two-level fusions (19/29 patients). Age did not affect the outcome concerning fusion solidity (Table 3).

In the 54 patients with a solid fusion, progressive postoperative disc degeneration in the fused level was registered in 29 patients and at the level above the fusion in 11. In the latter group, 7 had a good, 3 a fair and one a poor clinical result. 4 patients, all with spondylolysis-olisthesis and a solid fusion, had a substantial progress in slip value at follow-up. Neither progressive disc reduction nor progressive slip postoperatively precluded a favorable clinical outcome in the case of solid fusion (General Table).

Result related to preoperative diagnosis

In the spondylolysis-olisthesis group, 29 patients were classified as good, with minor or no residual back pain (Table 1); all had pain relief that they felt justified the operation. Improvement correlated with solid fusion in this group, P 0.0001 (Table 2). Considering the degree of radiating leg pain, 29 patients

Table 1. Pain relief, fusion healing frequency, consumption of analgesics, disability pension frequency and working ability at follow-up, related to diagnosis

	Relief of back pain n 71			Radiographic healing n 70		Consumption of analgesics n 62			Disability pension n 62			Return to employment n 71	
	Good	Fair	Poor	Solid	Pseud-arthrosis	None	In-frequent	Regular	No	Partial	Full	Yes	No
Spondylolysis-olisthesis	29	3	11	34	8	26	7	5	32	2	4	28	15
Degeneration [a]	8	2	6	10	6	11	1	1	9	1	3	8	8
Pain postlaminectomy	6	4	2	10	2	3	3	5	8	2	1	9	3

[a] including facet joint arthrosis

Table 2. Clinical outcome in terms of back pain related to the fusion healing result

	Spondylolysis-olisthesis		Degeneration/facet joint arthrosis		Pain post-laminectomy		Total	
	Solid fusion	Pseud-arthrosis	Solid fusion	Pseud-arthrosis	Solid fusion	Pseud-arthrosis	Solid fusion	Pseud-arthrosis
Good	28	0	8	0	5	1	41	1
Fair	2	1	0	2	4	0	6	3
Poor	4	7	2	4	1	1	7	12

Table 3. Radiographic outcome related to patient age at operation

	Spondylolysis-olisthesis			Degeneration/Facet joint arthrosis			Pain post-laminectomy			Total		
Age	<26	26–50	>50	<26	26–50	>50	<26	26–50	>50	<26	26–50	>50
Solid fusion	11	21	2	0	7	3	0	8	2	11	36	7
Pseudarthrosis	5	3	0	0	4	2	0	2	0	5	9	2

were classified as good (1 after a subsequent nerve root decompression), 4 as fair and 10 as poor (1 in spite of a subsequent nerve root decompression). The need for analgesics correlated with the evaluation of the pain-relieving effect, with 26 patients using no analgesics at all, P 0.001 (Table 1). Before surgery, 10 patients with spondylolysis-olisthesis were working in spite of their back pain while 28 had returned to employment at follow-up and 6 received a disability pension. The working ability of some patients was still under consideration by the Social Insurance Board.

In the group operated on for disc degeneration/facet joint arthrosis, good clinical results were registered in 8 of the 16 patients. There was a tendency towards better clinical results in patients with a solid fusion, P 0.06 (Table 2). Only 2 patients used analgesics, both classified as having a poor result. 8 patients were working full time compared to 3 before surgery.

In the post laminectomy group, no clear correlation between clinical success/improvement and solid fusion was found, P 0.2 (Table 2). 6 of the 12 patients had a good result. The need for analgesics was most frequent in this group with 8 patients using them to some extent. All the patients were on sick leave preoperatively; at follow-up, 9 had returned to employment.

Discussion

The question of when to fuse a spinal segment is still controversial. The lack of means to demonstrate painful segmental spinal mobility causes significant diagnostic errors and for the preoperative selection of patients we certainly need better objective instruments (Nachemson 1985). The value of preoperative

external fixation tests (Ordeberg et al. 1993) and facet joint blocks (Jackson et al. 1988, Lilius et al. 1989) seem limited. In the future, preoperative segmental mobility and hypermobility may be determined by roentgen stereophotogrammetric analysis (Selvik 1989, Johnsson et al. 1990).

The conventional radiography used in this study has certain limitations for assessing fusion solidity. Use of active movements with radiographs in flexion/extension can hardly be of any value, considering the fact that the range of lumbar motion and therefore the grade of provocation increases with improving clinical result. Thus, a successful spinal fusion increases spinal mobility. This paradox is probably due to the relief of a preoperative reflex protective muscle spasm, which in the case of pseudarthrosis, however, persists. Roentgen stereophotogrammetric analysis with a high degree of accuracy and a standardized provocation without active spinal movements may solve this problem in future prospective studies (Johnsson et al. 1990).

However, in spite of these diagnostic errors, the patients with radiographic healing turned out to have superior clinical results in this follow-up. The aim of achieving fusion solidity therefore seems justified. Concerning the other radiographic parameters studied (progressive postoperative disc reduction at the level of or the level above fusion and progressive slip postoperatively) of which one or more were encountered in more than half of the patients with solid fusion, no correlation with the clinical outcome was found. Using posterolateral fusion without instrumentation, no postoperative complications were found but the procedure left a varying number of patients with pseudarthrosis in each diagnostic group.

For the spondylolysis-olisthesis group the healing rate corresponded with the findings of other authors using the same technique (Stauffer and Coventry 1972b, Seitsalo 1990, Frennered et al. 1991). A prolonged period of postoperative lumbar immobilization seems to improve the result even further (Johnsson et al. 1992). Only one half of the patients with pseudarthrosis had symptoms requiring reoperation, yielding a total frequency of refusion around 10 percent in this group. Although it is known that, even without nerve root decompression, significant relief of radiating pain can be achieved with fusion of the olisthetic segment (Johnson et al. 1988, Peek et al. 1989, Johnsson et al. 1990), in this group 11 of 37 had no such relief. We still lack the instruments for preoperative selection of the patients for whom this relief can be expected. Radicular dominance of pain may be an indication for performing a laminectomy as well. Neurological deficits and the grade of pedicular kinking of the nerve root (Annertz et al. 1990) are other factors to be considered in this preoperative planning.

A discouraging fusion rate was found in the degenerative group. For this group, future evaluation of the effect of additional internal spinal instrumentation seems particularly urgent. In a prospective, randomized study, improved fusion rate has been gained using this technique (Lorenz et al. 1991).

The group with pain post-laminectomy is heterogeneous, containing both patients with persisting radicular pain and patients with mainly lumbar pain. In the latter category one can distinguish a fraction of patients with obvious radiographic instability/deformity caused by facet joint resection at the primary operation. Until we gain better methods for preoperative selection and considering the lack of correlation between clinical success and fusion solidity in the post-laminectomy group, a fusion procedure can probably be justified only when demonstrating such instability/deformity (Strömqvist 1993).

We conclude that non-instrumented posterolateral fusion is a simple surgical procedure that can be performed without per- and postoperative complications, but unfortunately it has a 20 percent non-union rate. We regard it as the procedure of choice for one-level fusions of isthmic spondylolisthesis.

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References

Annertz M, Holtås S, Cronqvist S, Jönsson B, Strömqvist B. Isthmic lumbar spondylolisthesis with sciatica. MR imaging vs myelography. Acta Radiol 1990; 31 (5): 449–53.

Boxall D, Bradford D S, Winter R B, Moe J H. Management of severe spondylolisthesis in children and adolescents. J Bone Joint Surg (Am) 1979; 61 (4): 479–95.

Danielson B, Frennered K, Irstam L. Roentgenologic assessment of spondylolisthesis. I. A study of measurement variations. Acta Radiol 1988; 29 (3): 345–51.

Danielson B, Frennered K, Selvik G, Irstam L. Roentgenologic assessment of spondylolisthesis. II. An evaluation of progression. Acta Radiol 1989; 30 (1): 65–8.

Frennered A K, Danielson B I, Nachemson A L, Nordwall A B. Midterm follow-up of young patients fused in situ for spondylolisthesis. Spine 1991; 16 (4): 409–16.

Gill K, Krag M H, Johnson G B, Haugh L D, Pope M H. Repeatability of four clinical methods for assessment of lumbar spinal motion. Spine 1988; 13 (1): 50–3.

Jackson R P, Jacobs R R, Montesano P X. 1988 Volvo award in clinical sciences. Facet joint injection in low-back pain. A prospective statistical study. Spine 1988; 13 (9): 966–71.

Johnson L P, Nasca R J, Dunham W K. Surgical management of isthmic spondylolisthesis. Spine 1988; 13 (1): 93–7.

Johnsson R, Selvik G, Strömqvist B, Sunden G. Mobility of the lower lumbar spine after posterolateral fusion determined by roentgen stereophotogrammetric analysis. Spine 1990; 15 (5): 347–50.

Johnsson R, Strömqvist B, Axelsson P, Selvik G. Influence of spinal immobilization on consolidation of posterolateral lumbosacral fusion. A roentgen stereophotogrammetric and radiographic analysis. Spine 1992; 17 (1): 16–21.

Kabins M B, Weinstein J N, Spratt K F, Found E M, Goel V K, Woody J, Sayre H A. Isolated L4-L5 fusions using the variable screw placement system: unilateral versus bilateral. J Spinal Disord 1992; 5 (1): 39–49.

Lee C K, Langrana N A. Lumbosacral spinal fusion. A biomechanical study. Spine 1984; 9 (6): 574–81.

Lilius G, Laasonen E M, Myllynen P, Harilainen A, Grönlund G. Lumbar facet joint syndrome. A randomised clinical trial. J Bone Joint Surg (Br) 1989 Aug; 71 (4): 681–4.

Lorenz M, Zindrick M, Schwaegler P, Vrbos L, Collatz M A, Behal R, Cram R. A comparison of single-level fusions with and without hardware. Spine (8 Suppl) 1991; 16: S455–8.

Nachemson A L. Fusion for low back pain and sciatica (editorial). Acta Orthop Scand 1985; 56 (4): 285–6.

O'Beirne J, O'Neill D, Gallagher J, Williams D H. Spinal fusion for back pain: a clinical and radiological review. J Spinal Disord 1992; 5 (1): 32–38.

Ordeberg G, Enskog J, Sjöström L. Diagnostic external fixation of the lumbar spine. Acta Orthop Scand (Suppl 251) 1993; 64: 94–6.

Peek R D, Wiltse L L, Reynolds J B, Thomas J C, Guyer D W, Widell E H. In situ arthrodesis without decompression for Grade III or IV isthmic spondylolisthesis in adults who have severe sciatica. J Bone Joint Surg (Am) 1989; 71 (1): 62–8.

Pope M H, Hanley E N, Matteri R E, Wilder D G, Frymoyer J W. Measurement of intervertebral disc space height. Spine 1977; 2 (4): 282–6.

Saraste H, Broström L A, Aparisi T, Axdorph G. Radiographic measurement of the lumbar spine. A clinical and experimental study in man. Spine 1985; 10 (3): 236–41.

Schober P. Lendenwirbelsäule und Kreuzschmerzen. Münch Med Wschr 1937; 84 (9): 336–8.

Seitsalo S. Operative and conservative treatment of moderate spondylolisthesis in young patients. J Bone Joint Surg (Br) 1990; 72 (5): 908–13.

Selvik G. Roentgen stereophotogrammetry. A method for the study of the kinematics of the skeletal system. 2nd Ed. Acta Orthop Scand (Suppl 232) 1989; 60.

Stauffer R N, Coventry M B. Anterior interbody lumbar spine fusion. Analysis of Mayo Clinic series. J Bone Joint Surg (Am) 1972a; 54 (4): 756–68.

Stauffer R N, Coventry M B. Posterolateral lumbar-spine fusion. Analysis of Mayo Clinic series. J Bone Joint Surg (Am) 1972b; 54 (6): 1195–204.

Strömqvist B. Postlaminectomy problems with reference to spinal fusion. Acta Orthop Scand Suppl 1993; 251: 87–9.

Legend to General Table

A Age at operation
B Sex
C Diagnosis
  1 Spondylolysis-olisthesis
  2 Degenerative disc disease/ Facet joint arthrosis
  3 Pain post-laminectomy/decompression
D Preoperative duration of lumbar pain (months)
E Preoperative duration of leg pain (months)
F At work preoperatively
  1 No
  2 Yes
G Fusion level
  1 L5–S1
  2 L4–S1
  3 Other level
H Number of fusion levels
I Subsequent spinal surgery before follow-up
  1 No
  2 Decompression
  3 Refusion
J Return to employment after fusion
  1 No
  2 Yes
K Definitive disability pension
  1 No
  2 Partial
  3 Full
L Preoperative disc degeneration at intended fusion level
  1 Normal disc height
  2 Disc height decreased by less than 50 percent
  3 Disc height decreased by at least 50 percent
  4 Disc obliterated
M Preoperative disc degeneration above intended fusion level
  As above (L)
N Preoperative slip, percent
O Fusion healing
  1 Solid
  2 Pseudarthrosis
P Disc degeneration at fused level at follow-up
  As above (L)
Q Disc degeneration above fused level at follow-up
  As above (L)
R Slip at follow-up, percent
S Follow-up time(years)
T Clinical result, back pain
  1 Good
  2 Fair
  3 Poor
U Clinical result, leg pain
  As above (T)
V Need for analgesics
  1 None
  2 Infrequent
  3 Daily and regular
W Lumbar mobility, Schober's test (cm)
X Straight leg raising test
  1 No radiating pain elicited
  2 Radiating pain at 60°–90°
  3 at 30°–60°
  4 at 0°–30°

General Table.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
21	M	1	60	12	1	2	2	3	1	1	1	1	15	2	–	–	–	–	3	3	–	–	–
44	F	1	24	24	1	2	2	3	1	1	3	1	13	2	–	–	–	–	3	3	–	–	–
26	F	1	36	12	1	1	1	3	1	1	2	1	49	2	–	–	–	–	3	3	–	–	–
46	M	2	24	24	1	2	2	1	1	1	2	1	0	2	2	1	0	4	2	3	1	1	1
31	F	3	33	33	1	2	2	1	1	3	2	1	0	1	2	1	0	2	3	3	3	2	4
17	M	1	60	12	1	1	1	1	1	1	2	2	0	1	2	2	0	2	1	1	1	7	1
24	M	1	18	18	1	1	1	1	1	1	4	1	38	1	4	1	38	2	3	3	2	4	2
21	F	1	24	24	1	2	2	1	2	1	3	2	54	1	4	2	82	3	1	1	1	8	1
52	F	3	38	3	1	1	1	1	2	2	3	2	0	1	4	3	0	2	2	1	3	4	1
47	F	2	12	12	1	2	2	1	2	2	3	1	0	2	3	1	0	3	3	2	3	3	2
46	F	1	150	6	1	1	1	1	1	3	3	2	23	1	4	2	48	2	1	3	2	8	1
56	F	2	120	24	1	2	2	1	1	3	4	3	0	1	4	3	0	5	1	3	1	5	2
47	F	3	54	0	1	2	2	3	1	1	–	–	–	2	–	–	–	–	3	3	–	–	–
59	M	1	24	24	2	2	2	1	2	1	4	2	20	1	4	2	25	3	1	1	1	4	1
41	F	1	15	15	2	1	1	1	2	1	3	3	32	1	3	3	32	2	1	1	1	7	1
37	M	3	48	48	1	1	1	1	2	1	2	1	0	2	3	2	0	2	1	1	1	5	1
33	F	3	12	0	1	2	2	1	2	1	3	1	0	1	4	1	0	2	1	1	1	4	1
46	M	1	120	120	2	3	1	1	2	1	3	1	16	1	3	2	16	6	1	1	1	5	1
38	M	2	72	24	1	1	1	3	1	1	–	–	–	2	–	–	–	–	3	3	–	–	–
39	F	3	6	6	1	1	1	1	2	1	1	1	0	1	1	1	0	2	1	2	2	5	1
33	M	1	9	9	1	3	1	1	2	1	3	3	0	1	3	3	0	5	3	2	2	4	1
55	M	1	16	16	1	1	1	1	1	3	3	1	22	1	3	1	27	2	1	1	1	2	1
11	F	1	0	12	1	1	1	1	2	1	3	2	47	1	3	3	100	7	1	1	1	4	1
50	M	1	120	72	2	2	2	1	2	1	3	2	25	1	4	2	33	3	2	1	1	6	1
31	F	1	120	120	1	2	2	2	2	1	3	2	11	1	3	2	22	3	1	1	1	3	1
37	M	1	48	48	2	1	1	1	2	1	2	2	30	1	3	2	33	2	1	1	1	5	1
20	M	1	24	24	1	1	1	1	2	1	1	2	18	1	2	2	26	5	1	1	1	8	1
15	F	1	36	12	1	1	1	1	2	1	1	1	22	1	2	1	22	2	1	1	1	5	1
25	M	1	48	12	1	2	2	2	1	3	2	1	20	2	2	1	20	7	3	3	3	6	1
44	F	2	15	0	2	2	2	1	2	1	3	2	0	1	3	2	0	2	1	1	1	4	1
48	F	2	24	3	1	1	1	2	1	3	2	1	0	1	3	2	0	7	3	3	1	5	1
37	M	1	36	0	1	1	1	1	2	1	2	1	18	1	2	1	17	4	1	1	1	6	1
67	F	2	144	12	1	1	1	3	1	1	–	–	–	2	–	–	–	–	3	3	–	–	–
53	F	2	36	18	1	1	1	1	1	3	3	1	0	1	4	1	0	2	1	1	1	5	1
24	M	1	22	22	1	1	1	1	2	1	1	1	29	1	2	1	32	4	1	1	1	4	1
46	M	1	30	30	1	2	2	3	1	1	4	1	32	2	–	–	–	–	3	3	–	–	–
46	F	2	156	156	1	1	1	1	2	1	3	1	0	1	4	1	0	6	1	1	1	4	1
33	M	1	24	12	2	3	1	1	2	1	3	1	23	1	3	2	25	4	1	1	1	7	1
48	M	2	12	12	1	1	1	1	2	1	2	1	0	1	3	1	0	3	1	1	1	5	1
17	M	1	36	4	1	1	1	1	2	1	1	1	0	2	1	1	0	2	2	2	2	6	2
33	F	1	24	12	1	2	2	1	2	1	3	1	28	1	4	2	46	3	1	1	1	3	2
34	M	1	12	0	1	1	1	1	2	1	1	2	0	1	1	2	0	3	1	1	1	5	1
54	F	2	240	120	1	2	2	1	2	1	3	2	0	2	3	2	0	2	2	1	1	3	1
35	M	1	60	60	2	1	1	1	2	1	1	1	18	1	2	1	27	3	1	1	1	6	1
49	M	3	64	0	1	1	1	1	2	1	2	1	0	1	2	2	0	2	2	1	3	1	1
21	M	1	15	3	1	2	2	1	1	1	2	3	21	2	2	3	20	3	3	3	3	0	2
15	F	1	24	24	1	2	2	1	2	1	4	2	65	1	4	2	78	3	1	1	2	6	2
21	M	1	12	12	1	2	2	1	1	1	4	2	50	1	4	2	75	3	1	1	1	5	1
44	F	3	6	6	1	2	2	1	2	1	2	2	0	1	3	2	0	4	2	2	1	2	3
14	M	1	12	6	1	2	2	3	1	1	2	2	49	2	–	–	–	–	3	3	–	–	–
31	M	1	84	84	1	1	1	1	2	1	1	1	15	1	2	2	20	2	1	1	1	3	1
50	F	1	180	36	1	1	1	1	1	1	1	4	29	1	1	4	29	2	2	1	3	3	1
26	M	2	45	45	1	2	2	1	2	1	3	2	0	1	3	2	0	3	1	1	1	3	1
46	M	1	120	12	1	2	2	1	2	1	3	3	20	1	3	3	26	3	1	1	1	4	1
31	M	3	18	18	1	2	2	1	2	1	2	1	0	1	3	1	0	2	1	2	3	3	1
13	M	1	8	0	1	2	2	1	1	1	3	1	26	1	4	2	29	3	1	1	1	4	1
44	M	1	18	18	2	2	2	1	2	1	3	2	26	1	4	2	28	3	1	1	1	4	1
41	M	2	24	24	2	1	1	1	2	1	1	2	0	1	2	2	0	3	1	1	1	6	1
30	M	1	26	26	1	2	2	1	2	2	1	2	15	1	2	2	15	3	3	3	3	3	2
37	F	1	36	6	1	1	1	1	2	1	1	2	0	1	2	2	0	2	1	2	1	4	1
51	M	2	180	21	1	1	1	1	1	1	1	2	0	1	3	2	0	2	3	1	2	2	1
50	M	2	36	36	1	1	1	3	1	1	–	–	–	2	–	–	–	–	3	3	–	–	–
54	M	3	26	0	1	3	1	1	1	1	3	1	12	1	3	2	17	2	2	1	3	6	1
29	F	3	60	60	1	1	1	1	2	2	2	2	0	1	3	2	0	4	1	1	2	3	1
45	M	1	36	36	1	2	2	1	2	2	2	2	17	1	3	2	18	3	1	1	1	3	2
28	M	3	6	6	1	1	1	1	2	1	3	1	0	1	4	1	10	3	1	1	2	3	1
37	M	1	120	60	1	1	1	1	1	3	1	2	17	1	3	2	30	3	3	2	3	2	2
25	F	1	12	0	1	1	1	1	2	1	2	1	20	1	4	2	29	5	1	1	2	5	1
41	M	1	6	0	2	1	1	1	2	1	3	1	20	1	3	1	25	6	1	1	1	4	1
34	M	2	240	0	2	1	1	1	2	1	3	3	0	1	3	3	0	6	1	1	1	4	1
42	M	1	120	0	2	1	1	1	2	1	3	1	33	–	–	–	–	7	1	1	2	–	–