Table S1. Patient characteristics and missing data

Characteristic	Pathway Data (%) *n*=445	Missing Data (%) *n*=55
Sex		
Male	303 (68)	39 (71)
Female	142 (32)	16 (29)
Age (years)		
Mean ± SD	61.2 ± 12.2	60.2 ± 12.7
Range	21.2 – 89.0	22.2 – 83.4
Alcohol status		
Never	90 (20)	6 (11)
Light/Moderate	162 (36)	15 (27)
Heavy	93 (21)	21 (38)
Former	48 (11)	6 (11)
Not reported	52 (12)	7 (13)
Smoking status		
Never smoked	117 (26)	13 (24)
Former smoker	151 (34)	23 (42)
Current smoker	136 (31)	15 (27)
Not reported	41 (9)	4 (7)
Primary site		
Oral cavity	303 (68)	30 (55)
Pharynx & Larynx	42 (8)	8 (15)
Skin	39 (9)	7 (13)
Paranasal/Nasal	27 (6)	4 (7)
Other	34 (8)	6 (11)
Histology		
Squamous cell	356 (80)	41 (75)
Other cancer	83 (18)	10 (18)
Benign	6 (1)	3 (5)
Not reported	7 (2)	1 (2)
Clinical stage		
0	8 (2)	1 (2)
I	44 (10)	0 (0)
II	70 (16)	3 (5)
III	66 (15)	6 (11)
IV	223 (50)	35 (64)
Not reported	34 (8)	10 (18)
Number of free flaps		
One	423 (95)	52 (95)
Two	22 (5)	3 (5)
Flap type		
Radial forearm	235 (53)	21 (38)
Fibula	95 (21)	9 (16)
Anterolateral thigh	57 (13)	17 (31)
Other	58 (13)	8 (15)
Resection extent		
Soft tissue	329 (74)	43 (78)
Bone	97 (22)	9 (16)
Soft tissue & bone	19 (4)	3 (6)

Values may not sum to 100% due to rounding

Table S2. Patient characteristics and mobilization within or after 48 h

Characteristic	POD 0-2 (%) n=342	After POD 2 (%) n=103	*p*-value
Sex			
Male	235 (68)	68 (66)	0.630
Female	107 (32)	35 (34)	
Age (years)			
Mean ± SD	61.2 ± 12.2	61.1 ± 12.2	0.482*
Alcohol status			
Never	66 (22)	24 (27)	0.391
Light/Moderate	134 (44)	28 (31)	
Heavy	68 (22)	25 (28)	
Former	35 (12)	13 (14)	
Smoking status			
Never smoked	95 (31)	22 (24)	0.267
Former smoker	110 (35)	41 (44)	
Current smoker	106 (34)	30 (32)	
Comorbidities			
None	106 (31)	36 (35)	0.185
One	112 (33)	24 (23)	
Two or more	124 (36)	43 (42)	
Specific Comorbidity			
Diabetes	39 (11)	15 (15)	0.392
COPD	39 (11)	11 (11)	1.000
Hypertension	136 (39)	45 (44)	0.494
Heart disease	37 (11)	22 (21)	**0.008**
Primary site			
Oral cavity	230 (67)	73 (71)	0.279
Pharynx & Larynx	33 (10)	9 (9)	
Skin	35 (10)	4 (4)	
Paranasal/Nasal	19 (6)	8 (8)	
Other	25 (7)	9 (9)	
Histology			
Squamous cell	272 (81)	84 (82)	**0.040**
Other cancer	58 (17)	18 (18)	
Benign	6 (2)	0 (0)	
Clinical stage			
0	4 (1)	4 (4)	0.151
I	35 (11)	9 (9)	
II	57 (18)	13 (13)	
III	53 (17)	13 (13)	
IV	163 (52)	60 (61)	
Number of free flaps			
One	328 (96)	95 (92)	0.191
Two	14 (4)	8 (8)	
Flap type			
Radial forearm	183 (53)	52 (50)	0.749
Fibula	69 (20)	26 (25)	
Anterolateral thigh	45 (13)	12 (12)	
Other	45 (13)	13 (13)	
Resection extent			
Soft tissue	261 (76)	68 (66)	**0.047**
Bone	70 (21)	27 (26)	

Soft tissue & bone	11 (3)	8 (8)

Values may not sum to 100% due to rounding. Fisher's exact tests were used for p-values, except for age (*independent t-test).

Table S3. Predictors of any postoperative complication and major postoperative complications using elastic net regularization followed by multivariable logistic regression.

Characteristic (reference level)	Any complication				Major complications			
	OR	95% CI	z	p-value	OR	95% CI	z	p-value
Age	1.02	1.00-1.05	2.18	**0.029**	1.01	0.98-1.04	0.88	0.377
BMI category *(healthy range)*								
Underweight	2.70	0.91-8.06	1.78	0.075	1.88	0.54-6.49	1.00	0.318
Overweight	0.69	0.39-1.23	-1.27	0.206	0.50	0.22-1.12	-1.68	0.093
Obese	1.04	0.54-2.02	0.13	0.899	0.82	0.36-1.92	-0.45	0.654
Sex *(male)*								
Female	0.75	0.43-1.30	-1.02	0.309	0.66	0.31-1.42	-1.05	0.292
Smoking Status *(never)*								
Former smoker	0.63	0.32-1.21	-1.39	0.166	0.47	0.20-1.10	-1.74	0.081
Current smoker	0.99	0.47-2.07	-0.04	0.969	0.21	0.07-0.59	-2.96	**0.003**
Alcohol status *(never)*								
Light/Moderate	0.72	0.37-1.42	-0.94	0.347	1.89	0.76-4.73	-1.37	0.171
Heavy	0.67	0.29-1.54	-0.94	0.349	1.23	0.38-3.96	0.35	0.725
Former drinker	0.41	0.16-1.03	-1.89	0.059	0.48	0.11-2.08	-0.99	0.324
Comorbidity *(none)*								
One	2.13	1.17-3.88	2.46	**0.014**	1.68	0.68-4.19	1.12	0.263
Two or more	1.93	1.06-3.54	2.13	**0.033**	2.57	1.10-6.00	2.18	**0.029**
Primary Site *(oral cavity)*								
Pharynx& Larynx	1.55	0.67-3.63	1.01	0.311	1.50	0.52-4.29	0.76	0.449
Paranasal/Nasal	0.67	0.20-2.18	-0.67	0.502	0.30	0.05-1.74	-1.34	0.180
Skin	1.15	0.35-3.72	0.23	0.819	0.20	0.03-1.58	-1.53	0.127
Other	0.37	0.11-1.28	-1.57	0.117	0.32	0.05-1.92	-1.25	0.211
Cancer stage *(I-II)*								
III-IV	1.96	1.15-3.35	2.47	**0.013**	2.22	0.96-5.14	1.86	0.063
Flap count *(one)*								
Two	1.09	0.06-21.05	0.06	0.956				
Resection extent *(soft tissue only)*								
Bone			0.02	0.986				
Soft tissue & bone	2.50	0.10-62.69	0.56	0.577				
Flap donor type *(radial forearm)*								
Fibula			-0.02	0.986	1.19	0.48-2.92	0.37	0.710
Anterolateral thigh	0.96	0.44-2.07	-0.11	0.909	1.41	0.47-4.29	0.61	0.541
Other	1.61	0.66-3.93	1.05	0.292	3.42	1.40-8.34	2.70	**0.007**
Unit arrival *(POD 0-1)*								
After POD 1	1.53	0.73-3.23	1.12	0.262	1.98	0.85-4.61	1.59	0.111
Mobilization *(POD 0-1)*								
After POD 1	1.23	0.71-2.12	0.75	0.455	0.97	0.43-2.21	-0.07	0.945
Mobilization *(POD 0-2)*								
After POD 2	1.75	0.88-3.50	1.59	0.111	2.61	1.10-6.21	2.17	**0.030**
Tracheostomy *(no)*								
Yes	1.43	0.66-3.11	0.91	0.364	0.38	0.14-1.09	-1.80	0.073

Table S4. Predictors of hospital length of stay using elastic net regularization followed by multivariable logistic regression.

Characteristic (reference level)	LOS >10 days			
	Odds ratio	**95% CI**	*z*	*p*-value
Age (centred at the mean)	1.03	1.00-1.05	2.30	0.021
BMI category *(healthy range)*				
Underweight	1.11	0.37-3.32	0.18	0.855
Overweight	0.62	0.33-1.19	-1.44	0.151
Obese	0.46	0.22-0.95	-2.10	0.036
Alcohol status *(never)*				
Light/Moderate	0.62	0.31-1.27	-1.31	0.191
Heavy	0.76	0.33-1.71	-0.67	0.504
Former drinker	2.43	0.91-6.53	1.76	0.078
Comorbidity *(none)*				
One	1.10	0.56-2.19	0.28	0.779
Two or more	1.57	0.77-3.18	1.24	0.215
Primary Site (*oral cavity*)				
Pharynx & Larynx	5.18	1.80-14.89	3.05	**0.002**
Paranasal/Nasal	0.05	0.01-0.29	-3.34	**0.001**
Skin	0.13	0.03-0.60	-2.60	**0.009**
Other	0.72	0.18-2.86	-0.47	0.640
Flap count *(one)*				
Two	0.25	0.01-7.56	-0.80	0.422
Flap type *(soft tissue only)*				
Bone	1.08	0.56-2.07	0.22	0.828
Soft tissue & bone	19.93	0.36-1099.16	1.42	0.144
Mobilization *(POD 0-2)*				
After POD 2	2.85	1.41-5.76	2.92	**0.004**
Tracheostomy *(no)*				
Yes	3.01	1.19-7.65	2.32	**0.020**
Any complication *(no)*				
Yes	6.76	3.74-12.22	6.32	**<0.001**
Major Complication *(no)*				
Yes	1.97	0.78-4.97	1.44	0.150

Table S5. Predictors of delayed mobilization (after 24 hours) using elastic net regularization followed by multivariable logistic regression.

Characteristic	Delayed mobilization			
	Odds ratio	**95% CI**	**z**	**p-value**
Unit arrival *(POD 0-1)*				
After POD 1	3.29	1.70-6.37	3.52	**<0.001**
Tracheostomy *(no)*				
Yes	2.81	1.73-4.56	4.18	**<0.001**
Any complication *(no)*				
Yes	1.31	0.86-2.02	1.25	0.213
Major Complication *(no)*				
Yes	1.26	0.68-2.35	0.73	0.468