Risk factors for 30, 60 and 90 day readmission rates following revision total joint arthroplasty

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INTRODUCTION: Over the next 10-15 years, there is expected to be an exponential increase in the number of total joint arthroplasties (TJA) in the American population. This combined with the rising costs of revision TJA necessitates a thorough understanding of risk factors for readmission rates. Previous studies investigated risk factors for readmission following primary TJA including surgical, implant and patient-specific risk factors. However, there is limited knowledge on risk factors for readmission following revision TJA. Therefore, the goal of our study is to identify any risk factor associated with 30, 60 and 90 day readmission rates for patients following revision TJA.

METHODS: A retrospective review was performed on 4166 patients who underwent revision hip or knee surgery (2477 hips; 1689 knees). Patient demographics, implant characteristics and surgical factors were evaluated alongside clinical outcomes in terms of 30, 60 and 90 day readmission rates. Binary logistic regression analysis was used to identify any risk factor associated with 30, 60 and 90 day readmission rates.

RESULTS: Binary logistic regression identified an increased age (older than 70 years) to be associated with a significant risk in 30, 60 and 90 day readmission rates ($p<0.01$). In additional, young age (younger than 50 years) was correlated with an increased risk of 90 day readmission rates ($p=0.02$). Males had a significantly higher risk of 30, 60 and 90 day readmission rates ($p<0.01$; $p=0.02$; $p=0.06$), when compared to females. The use of unicompartmental arthroplasty was associated with a significantly lower risk of 30, 60 and 90 day readmission rates ($p<0.01$; $p<0.01$; $p=0.02$), when compared to TKA. An increased length of hospital stay (greater than 4 days) was associated with an increased risk for 60 and 90 day readmission ($p=0.01$; $p=0.05$). Multiple comorbidities were found to have an effect on increased 30, 60 and 90 day readmission rates. These include obesity ($p<0.01$), diabetes ($p<0.01$), malignant tumor ($p<0.01$) and depression ($p=0.02$). There was no association between 30, 60 and 90 day readmission rates and ethnicity ($p=0.36$), marital status ($p=0.44$) and alcohol consumption ($p=0.58$).

DISCUSSION: This study identified implant and patient-specific risk factors, such as an age > 70 years, male gender and multiple comorbidities, which are associated with 30, 60 and 90 day readmission rates. As the number of revision TJA procedures will continue to rise over the next decade, knowledge of those risk factors will assist in clinical planning. As some of the risk factors that were identified in this study are modifiable, such as obesity, the optimization of patients prior to revision TJA may likely yield not only improved patient outcomes but also decreased readmission rates and associated healthcare costs.

SIGNIFICANCE/CLINICAL RELEVANCE: This study identified implant and patient-specific risk factors associated with 30, 60 and 90 day readmission rates following revision TJA. As the number of revision surgeries will massively increase over the next decade, knowledge of these risk factors has the potential to assist in optimizing patient outcomes.

Table 1: Risk factors for patients with 30, 60 and 90 day readmission rates following revision TJA.

	30 Day Readmission		**60 Day Readmission**		**90 Day Readmission**	
	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value
Age above 70 years	1.06	**<0.01**	1.08	**<0.01**	1.13	**<0.01**
Male gender	1.14	**<0.01**	1.09	**0.02**	1.10	**0.06**
Ethnicity	0.94	0.33	0.87	0.41	0.99	0.39
Marital status	0.78	0.51	0.81	0.44	0.72	0.38
Hip/Knee	1.15	0.56	1.18	0.61	1.26	0.47
Unicompartmental Replacement	1.13	**<0.01**	1.15	**<0.01**	1.09	**0.02**
Length of stay > 4 days	1.27	0.16	1.19	**0.01**	1.13	**0.05**
Obesity	1.46	**<0.01**	1.51	**<0.01**	1.52	**<0.01**
Malignant tumor	1.08	**<0.01**	1.11	**0.02**	1.09	**0.06**
Depression	1.10	0.44	1.08	0.48	1.12	0.57
Diabetes	1.07	**<0.01**	1.09	**<0.01**	1.12	**0.03**
Renal disease	1.31	0.62	1.27	0.66	1.24	0.71
Smoking	1.11	0.49	1.14	0.32	1.15	0.37
Drinking	1.06	0.75	1.04	0.62	1.07	0.53