

## **The Cumulative Effect of Depression and Substance Abuse on Postoperative Complications After Primary Total Knee Arthroplasty**

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**Introduction:** Substance abuse, alcohol abuse and depression have individually been shown to negatively affect total knee arthroplasty (TKA) outcomes. However, their cumulative effect on postoperative complications has not been well elucidated. Therefore, this study aimed to determine the impact of depression, substance abuse and alcohol abuse on postoperative complications following TKA.

**Methods:** TKA patients were prospectively followed at 15 hospitals in a large health system between 2017 and 2019. Patients with depression, substance abuse and alcohol abuse were identified using diagnosis codes. Variables collected were patient demographics, medical comorbidities, prosthetic joint infections (PJI), urinary tract infections, cellulitis, periprosthetic fractures, instabilities, implant failures, osteolyses and thromboemboli. Univariate analysis and multivariate analyses were performed to identify the combinations of mental health disorders associated with complications.

**Results:** 11,403 TKA patients were identified: 1,536 with a history of depression, 591 with a history of substance abuse and 91 with a history of alcohol abuse. Univariate analysis showed that depression was associated with implant failures ( $p < 0.001$ ) and alcohol abuse with PJIs ( $p < 0.001$ ) and deep vein thromboses ( $p = 0.003$ ). Substance abuse was associated with PJI ( $p < 0.001$ ), wound complications ( $p = 0.022$ ) and implant loosening ( $p = 0.007$ ). Multivariate analyses found that alcohol abuse (OR: 19.419,  $p < 0.001$ ), substance disorder (OR: 3.693,  $p = 0.010$ ), and depression plus substance (OR: 13.639,  $p < 0.001$ ) were associated with PJIs. Additionally, depression plus alcohol (OR: 26.616,  $p = 0.000$ ) and depression plus substance abuse (OR: 4.401,  $p = 0.021$ ) were associated with cellulitis.

**Conclusions:** Patients with depression, substance abuse or alcohol abuse were found to be at greater risk of postoperative complication. In combination, the cumulative effect of depression and abuse was found to be far more likely to be associated both PJI and cellulitis than if found in isolation. The results of this study can help identify those patients who are at greater risk for postoperative complications in order to enable improved preoperative optimization and patient education.