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TransFORM-TMD: a feasibility device trial

Submission date
16/10/2026

Recruitment status
Recruiting

Registration date
27/11/2026

Overall study status
Ongoing

Last Edited
27/11/2026

Condition category
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Temporomandibular disorders (TMD) are musculoskeletal conditions affecting the jaw joint and jaw muscles. Some people experience persistent painful myalgia TMD, where symptoms last for more than three months and can have a significant impact on daily life. Depression is also common in people with TMD. Transcutaneous auricular vagus nerve stimulation (taVNS) is a non-invasive treatment that delivers electrical stimulation to the vagus nerve through the ear and has shown potential benefits in other painful conditions and in depression. This study aims to assess whether it is feasible to conduct a larger clinical trial of self-delivered taVNS in people with persistent myalgia TMD and depression, and to explore its effects on symptoms, autonomic function and inflammatory markers.

Who can participate?
Adults aged 18 years and over with persistent myalgia temporomandibular disorder lasting at least three months, who have completed TMD self-management for at least six weeks and are able to provide written informed consent in English.

What does the study involve?
Participants are randomised to receive either a taVNS device or a sham device. Participants use the device at home for 12 weeks. The study is double-blinded, meaning participants do not know which device they have been allocated. Assessments are conducted over the 12-week study period.

What are the possible benefits and risks of participating?
The protocol states that the study will collect evidence on whether taVNS is likely to be helpful for people with TMD and depression.

Risks not provided at time of registration

Where is the study run from?
Newcastle Dental Clinical Research Facility, Newcastle upon Tyne, England.

When is the study starting and how long is it expected to run for?
November 2026 to November 2027.

Who is funding the study?
NIHR Newcastle Biomedical Research Centre and NIHR North East and North Cumbria Regional Research Delivery Network, UK.

Who is the main contact?
Dr James Allison, Newcastle University, james.allison@newcastle.ac.uk.

Contact information

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Additional identifiers

Integrated Research Application System (IRAS)
361775

Study information

Scientific Title
TransFORM-TMD: Transcutaneous auricular vagus nerve stimulation FOR Myalgia TemporoMandibular Disorder and depression: a parallel-arm, double-blind, randomised, sham-controlled, feasibility device trial

Acronym
TransFORM-TMD

Study objectives
Primary research question: Is the delivery of a trial assessing self-delivered transcutaneous auricular vagus nerve stimulation (taVNS) feasible in people with persistent myalgia TMD and depression?

Secondary research questions: Does taVNS improve symptoms in persistent painful myalgia temporomandibular disorder and depression? Does taVNS produce changes in autonomic measures, such as heart rate variability, and markers of inflammation? How do these changes correlate with mood and quality of life measures?

Ethics approval required
Ethics approval required

Ethics approval(s)
Submitted 12/12/2025, Yorkshire & The Humber - Sheffield Research Ethics Committee (NHS Blood and Transplant Blood Donor Centre Holland Drive, Newcastle upon Tyne, NE2 4NQ, United Kingdom; +44 (0)2071048226; sheffield.rec@hra.nhs.uk), ref: 25/YH/0236

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Blinded (masking used)

Control
Placebo

Assignment
Parallel

Purpose
Treatment

Study type(s)

Health condition(s) or problem(s) studied
Temporomandibular disorder (TMD) and depression

Interventions
Study design and randomisation
This is a single-centre, double-blind, sham-controlled, parallel-group randomised feasibility trial involving 40 adults with persistent myalgia temporomandibular disorder (TMD). Participants will be randomised in a 1:1 ratio to receive either active transcutaneous auricular vagus nerve stimulation (taVNS) or sham stimulation. Randomisation will be performed using a secure, web-based computer-generated randomisation system on REDCap, using permuted blocks of eight to ensure balanced allocation.

Participants and investigators involved in recruitment and outcome assessments will remain blinded to treatment allocation. An independent member of the research team, not involved in recruitment or assessments, will configure the devices according to allocation.

Arm 1: Active taVNS
Participants allocated to the active intervention will receive a Parasym™ taVNS device (Parasym Ltd), a CE-marked Class IIa medical device. Electrical stimulation will be delivered non-invasively through a clip-on electrode positioned on the tragus of the left ear.

The device delivers a proprietary electrical waveform with stimulation parameters within the following ranges: frequency 1–30 Hz, pulse width 50–250 μs and current intensity 1–36 mA. Participants will adjust the current intensity to their individual sensory threshold (perception of tingling) at the beginning of each session.

Following initial training by the research team, participants will self-administer stimulation at home for 30 minutes twice daily (morning and evening), at times of their choosing, over 12 consecutive weeks.

Arm 2: Sham taVNS
Participants allocated to the sham group will receive an identical Parasym™ device, configured

using the manufacturer's research sham setting. The device and electrode placement will be identical to those in the active intervention group, and participants will follow the same treatment schedule of 30 minutes twice daily for 12 weeks.

In sham mode, the device initially operates in the same manner as the active device, but the stimulation current is gradually reduced to 0 mA shortly after the start of each session, resulting in no sustained electrical stimulation. This approach is intended to maintain participant blinding while controlling for the experience of using the device.

Treatment duration and follow-up
Both groups will receive their allocated intervention for 12 weeks. All participants will receive standardised TMD self-management advice before enrolment and will have completed at least six weeks of self-management before randomisation.

Clinical outcomes, including pain, mood and global impression of change, will be assessed using electronic questionnaires at four-week intervals. Physical activity and physiological measures will be collected throughout the 12-week intervention period using a wearable smartwatch. Baseline assessments will be repeated at the end of treatment (week 12), alongside assessments of intervention acceptability, adverse events, feasibility and effectiveness of blinding.

The total duration of treatment and follow-up for each participant following randomisation is 12 weeks, with no additional post-treatment follow-up specified.

Intervention Type
Device

Phase
Phase II

Drug/device/biological/vaccine name(s)
Parasym taVNS device (Parasym Ltd)

Primary outcome(s)
1. Participant recruitment rate measured using study screening and recruitment logs on REDCap, including the number of participants screened, eligible, consenting and randomised, throughout the recruitment period, with the final recruitment rate calculated at the end of the study (12 weeks)

2. Participant retention rate measured using study attendance and withdrawal records maintained in the REDCap study database, calculated as the proportion of randomised participants completing the 12-week follow-up assessment, at week 12 for each participant and summarised at the end of the study

3. Adherence to treatment measured using participant-reported treatment adherence records, assessing the number of stimulation sessions completed relative to the prescribed schedule of twice-daily stimulation (obtained from the stimulation device), throughout the 12-week intervention period, with adherence summarised at week 12

4. Acceptability of treatment measured using the Acceptability of Intervention Measure (AIM) at week 12

5. Data completeness measured using the REDCap study database and study assessment records, calculating the proportion of expected outcome assessments and data fields successfully completed at baseline, weeks 4, 8 and 12, with overall completeness summarised at the end of the study

6. Feasibility of study procedures measured using participant feedback collected through open-ended questions at week 12

7. Effectiveness of participant blinding measured using a participant-reported allocation guess (active or sham stimulation) at week 12, compared with actual treatment allocation

Key secondary outcome(s)

1. Pain measured using the Graded Chronic Pain Scale (GCPS) at 12 weeks

2. General quality of life measured using EuroQol five-dimensional, five-level (EQ-5D-5L) and the Short Form-36 (SF-36) at 12 weeks

3. Disorder-specific quality of life measured using the Oral Health Impact Profile-TMDs (OHIP-TMDs) at 12 weeks

4. Function measured using the Jaw Functional Limitation Scale (JFLS) Short Form at 12 weeks

5. Global impression of change in: pain intensity, emotional state, unpleasantness of pain, quality of life measured using participant self-rated Patient Global Impression of Change (PGIC) at 12 weeks

6. Mood measured using the Patient health questionnaire 9 (PHQ-9), Quick Inventory of Depressive Symptomatology – self rated (QIDS-SR) and the Generalised Anxiety Disorder Questionnaire (GAD-7) at 12 weeks

7. Fatigue measured using the Functional Assessment of Chronic Illness Therapy – Fatigue (FACIT-F) and Visual Analogue Scale (VAS) at 12 weeks

8. Autonomic function measured using the Composite Autonomic Symptom Scale 31 (COMPASS-31) at 12 weeks

9. Cognitive function measured using the THINC-it tool and Threearmed Restless Bandit task at 12 weeks

10. Use of other treatments: e.g., analgesics, occlusal splints, self-management etc. measured using a participant questionnaire at 12 weeks

11. Physical activity levels measured using accelerometer data from a Garmin VENU3 smartwatch at 12 weeks

12. Autonomic function, assessed via heart rate variability measured using a plethysmography from a Garmin VENU3 smartwatch at 12 weeks

13. Peripheral inflammatory markers measured using Olink multiplex immunoassay at 12 weeks

14. Immune cell populations measured using flow cytometry at 12 weeks

15. Oral microbiome measured using samples stored for future analysis by sequencing at 12 weeks

Completion date
30/11/2027

Eligibility

Key inclusion criteria
1. ≥ 18 years of age
2. Able to provide written informed consent in English
3. Diagnosis of persistent (≥3-month duration) myalgia temporomandibular disorder, according to international brief Diagnostic Criteria for Temporomandibular Disorders (bDC/TMD)
4. Completed TMD self-management for ≥ 6 weeks

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
99 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Current participation in another interventional trial
2. Non-myalgia TMD as the primary TMD complaint
3. Current orofacial pain other than TMD or oral disease likely to cause pain (e.g., untreated dental disease, neuropathic pain, trigeminal neuralgia)
4. Previous vagotomy
5. Long-term use of corticosteroids or immunomodulatory biological therapies (e.g., to treat inflammatory disorders)
6. Bipolar affective disorder, psychotic disorder or personality disorder
7. Dementia
8. Primary neurological injury (e.g., axonal injury, stroke or traumatic brain injury) or disorder (e.g., Parkinson’s disease)
9. Myocardial infarction (MI) within the previous 6 months
10. History of cardiac disease (e.g., cardiomyopathy, arrhythmia, prolonged QT interval)
11. Active implanted device at the ear, heart (e.g., pacemaker), or stimulating the nervous

system (e.g., implanted VNS, other neurostimulator)
12. Pregnancy
13. Not fluent in English

Date of first enrolment
16/11/2026

Date of final enrolment
30/11/2027

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Newcastle Dental Clinical Research Facility
Level 6, Leazes Wing
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Sponsor information

Organisation
Newcastle upon Tyne Hospitals NHS Foundation Trust

ROR
https://ror.org/05p40t847

Funder(s)

Funder type

Funder Name
NIHR Newcastle Biomedical Research Centre

Alternative Name(s)

Newcastle Biomedical Research Centre, Newcastle NIHR Biomedical Research Centre, NIHR Newcastle BRC, Newcastle Biomedical Research Centre - NIHR

Funding Body Type
Government organisation

Funding Body Subtype
Research institutes and centers

Location
United Kingdom

Funder Name
NIHR North East and North Cumbria Regional Research Delivery Network

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available