Parkinson's disease: an algorithm detects falls and movement alterations

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FBK, in collaboration with the Trento Province Healthcare System, has developed through artificial intelligence an algorithm that can predict the risk of falls and disease fluctuations in patients with Parkinson's disease. The initiative is part of a Ministry of Health project created to improve the management of central nervous system diseases.

A multidisciplinary team of experts has developed an **algorithm** that can predict the risk of falls and motor fluctuations (so-called "on – off" moments) typical of **Parkinson's** disease. Coordinated by **the Trento Province Healthcare System (APSS)**, the project involved the collaboration of **Fondazione Bruno Kessler (FBK), IRCCS Ospedale Policlinico San Martino, and the University of Genoa.**

Parkinson's disease is the second most frequent neurodegenerative disease worldwide after Alzheimer's; cases are estimated to double by 2030 due to the increasing aging of the general population.

Starting with **digitizing**, **harmonizing** and **organizing data from Parkinson's disease patients** admitted to the medical centers involved, researchers structured **disease-specific standardized datasets** and identified patterns of clinical and neuropsychological variables, based on artificial intelligence, that are critical for predicting possible trajectories of the disease.

The **study** consists of two stages. In a first stage, of retrospective observation, researchers focused on systematizing the data of patients already under the care of the Parkinson's center for some time, to obtain a detailed and harmonized description of the patients' clinical phenotype.

Lorenzo Gios, project manager with Fondazione Bruno Kessler's Center for [Digital Health & Wellbeing](#) **and TrentinoSalute4.0, a center of expertise on digital health, explained,** *"Correlating clinical phenotype with later symptom progression, as well as mapping the early onset of specific symptoms, can play a central role in risk*

prediction, personalization of treatment, and planning of appropriate preventive strategies. Providing clinicians and patients, through this research, with an additional key to understanding the disease's triggers and worsening factors and helping to prevent its often long and complex trajectory, is an important first milestone for us. Similarly, helping health care professionals in the management of such a high number of patients and postponing the worsening of their ymptoms as much as possible means doing our part in making the health care system more sustainable in the long run, especially in chronic cases."

In a second prospective phase, the research team will collect the same variables from the retrospective study in newly diagnosed patients enrolled in the same centers.

Maria Chiara Malaguti, medical director for the Neurology Operative Unit at Santa Chiara Hospital in Trento and coordinator of the Parkinson's clinical network at APSS, stressed, "*Once developed and validated, these models will greatly support the development of knowledge to improve the prevention, diagnosis and treatment of these diseases. For us clinicians, it means learning to manage chronici diseases with a new paradigm, a management model that allows us to know our patients better and personalize therapies.*"

This study is part of **NeuroArtP3**, a large Ministry of Health project established in 2020 with the aim of improving the management of diseases of the central nervous system such as Alzheimer's, Parkinson's, ALS, multiple sclerosis and brain tumors by taking advantage of the large amount of clinical data available to participating centers. With a total budget of about **2.4 million euros**, the **NeuroArtP3** project is co-funded by the Ministry of Health and the Regional Government (Liguria, Lombardy, Tuscany and the Autonomous Province of Trento) partner centers.

Among the entities involved, in addition to APSS Neurology directed by Prof. **Bruno Giometto,** the project's scientific contact person for Trento, are Istituto Giannina Gaslini in Genoa, IRCCS Ospedale San Raffaele in Milan and Fondazione Don Gnocchi in Florence.

Interviews conducted in Trento: https://youtu.be/KSEBaog6quM

- **Dr. Maria Chiara Malaguti** (Neurology Department at Santa Chiara Hospital, Trento Province Healthcare System)
- **Lorenzo Gios**, Ph.D. (Project Manager, TrentinoSalute4.0, Centro di Competenza sulla Sanità Digitale – Digital Health Research – Lab I Fondazione Bruno Kessler)
- **Dario Betti** (Councillor Parkinson Trento Odv)

For more information: www.trentinosalutedigitale.it

Fondazione Bruno Kessler – Communication and External Relations Service

ue.kbf(ta)aidem
– 0461 312482

TrentinoSalute4.0 – Media Relations

ue.kbf(ta)renaicul
– 331 6228664

SEC Newgate – Via Ferrante Aporti 8, Milano
Laura Arghittu –

ti.etagwences(ta)uttihgra.arual

Daniele Murgia – mobile 338 433 0031 –
ti.etagwences(ta)aigrum.eleinad

Vittoria Tonetti – mobile 334 906 4287 –
ti.etagwences(ta)ittenot.airottiv